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STEEL

ESTABLISHED 1882

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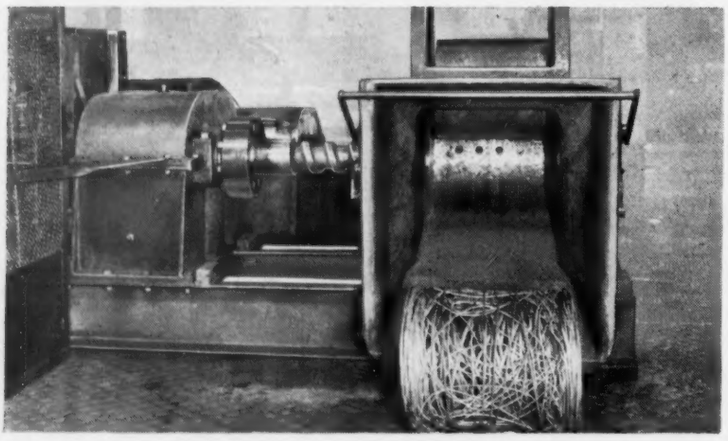
PRODUCTION • PROCESSING • DISTRIBUTION • USE

New, self-contained Morgan Cobble Bundler showing spiral mandrel, weight roller, safety arm, and guard screen.

MORGAN'S NEW COBBLE BUNDLER

Cobble Bundler in operation. This view also shows motor and controls.



As the motor is reversed the mandrel frees itself from the center of the bundle, causing bundle and hopper to move outward along the trackway until bundle is free, when it discharges by gravity. Hopper is then pushed back over the mandrel, and machine is again ready for use.

Takes the Lag out of Cobble Handling

Even cobble handling is made simpler and safer by typical Morgan thoroughness in design and perfection of details. This improved Morgan Cobble Bundler is a self-contained, semi-portable unit which takes up cobble quickly and effectively, bundling it to size suitable for open hearth charging boxes.

It is a complete unit ready to run; equipped with AC motor with solenoid brake or a DC motor with dynamic brake, a control panel, and special safeguards. The tapered mandrel has a coarse spiral thread which, as the motor is reversed, strips off the bundle, which then discharges by gravity. Safety of operation is stressed, an important feature being the guard-arm which stops the motor instantly with any up or down movement.

Write for further details on this Bundler and on other improved Morgan Rolling Mill Equipment.

MORGAN CONSTRUCTION COMPANY
WORCESTER, MASSACHUSETTS, U.S.A.

R-60

LET MORGAN (WORCESTER ENGINEERS AND MANUFACTURERS) REMOVE THE LAGS

STEEL
PRODUCTION • PROCESSING • DISTRIBUTION • USE

As the Editor Views the News

■ STEEL production last week was at 63.5 per cent of ingot capacity, unchanged (p. 21) from the week before. A slight subsidence in demand in some directions appears to be counterbalanced in others. Automobile production (p. 67) now is mounting. Plate demand is brisk for shipbuilding and pipeline construction. Some inquiries for railroad rolling stock have appeared. . . . The critical situation in Europe (p. 18) has speeded up acceptance of pending quotations but otherwise has had no notable effects here excepting to throw before the spotlight our status as a neutral. It is regarded as certain that England and France, in the event of war, would call on this country for materials and manufactured goods in large quantities, also that our exports to other destinations eventually would increase.

• • •

Trade Pacts

Russo-German trade pact revises drastically (p. 17) Germany's position in regard to industrial raw materials and foodstuffs. It also may reduce Russia's dependency on American manufacturers of machines and tools. On the other hand, in renewing its trade treaty with the United States, Russia (p. 18) proposes to spend no less than $40,000,000 for American goods during the coming year. . . . Steel industry has a considerable stake in the new trade agreement now being negotiated between the United States and Belgium. Interested parties (p. 26) may submit briefs up to Sept. 27; hearings will be held Oct. 9. . . . American iron and steel exports (p. 20) dropped 13.8 per cent in July. Industrial machinery exports rose 17 per cent; farm equipment exports dropped slightly.

• • •

Steel Safer

Claiming to represent 50,000 of Republic Steel Corp.'s Ohio employes, Central Council of Steel Plants last week accused the national labor relations board (p. 19) of "gross abuse of discretion" in refusing to hear its testimony. Inland Steel Co. petitions that a board order be set aside on the ground that the board's conduct was of a "prejudicial and coercive character". . . . In five years the steel industry (p. 16) has advanced from twelfth to the third safest industry. . . . Interstate commerce commission (p. 25) has reached a decision with respect to rates on shipments of pipe and fittings to the Southwest. . . . Primary purpose of department of commerce's new division of industrial economics (p. 25) is "to bring improvement in fields where business progress is retarded."

• • •

Improves Efficiency

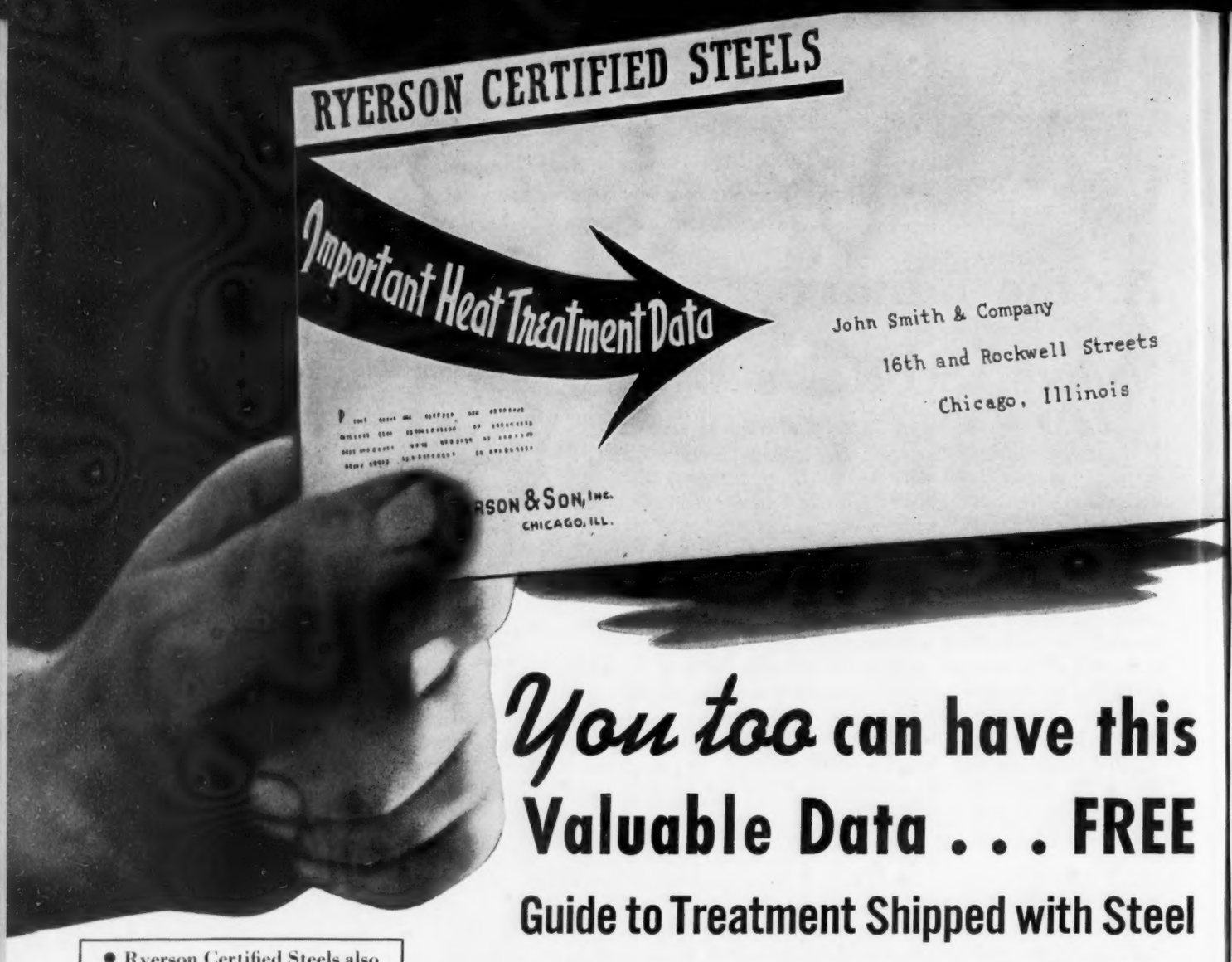
Efficiency of modern machine tools is increased by multiple cutting, says Guy Hubbard, STEEL's machine tool editor. He cites several instances (p. 36) in which utilization of such technique sharply has reduced total machining time per piece. . . . Two new aids make radiography a dependable production tool (p. 38) for nondestructive testing of welded structures. Penetrameters guarantee the proper volt-ampere-time relationship; and the use of fluorescent intensifying screens reduces the exposure time to one-sixteenth that formerly required. . . . Much progress has been made in speeding the operations of trimming and welding strip coil ends (p. 42) to derive fullest benefit from the increased speed of modern continuous pickling lines and rolling mills.

• • •

Load Ore by Conveyor

Consistent labor policies are highly important to successful industrial relations. A management engineer (p. 46) emphasizes the need for written personnel policies and discusses the factors involved in working out such policies. . . . A new blast furnace mud gun utilizing higher clay pressures (p. 49) completes the operation of plugging the taphole, against full blast pressure, in about 40 seconds. . . . Good results now are obtained with arc welding by the metallic process (p. 50) in joining sheets as thin as 24-gage. . . . Iron ore is loaded in ocean freighters off Samar island in the Philippines (p. 44) by means of an 825-foot belt conveyor . . . . Modern instruments are of great value in checking performance; they point to quick solutions (p. 53) to many steel mill problems.

E C Kreutzberg



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SLIGHT DROP IN FARM EQUIPMENT PURCHASES INDICATED

■ FARM equipment builders, consumers of a million tons of steel in good business years, apparently will fall slightly short of hoped-for results in 1939. Little more than a stand-off compared with 1938 originally was looked for in implement and tractor sales this year. At present, a 10 to 15 per cent drop is indicated, with the principal shrinkage shown in implements.

Equipment buying to a large extent parallels the trend in cash farm income. Cash income of agriculture so far this year has been close to the 1938 level, thanks in some measure to increased government payments. However, latest comparisons with last year have been less favorable, and sagging prices for farm commodities hardly are calculated to encourage equipment sales.

Farmers' cash income from marketings alone the first seven months this year is estimated by the bureau of agricultural economics at $3,501,000,000, or 5 per cent less than a year ago. July income of $534,000,000, however, was 12 per cent below the estimate for the 1938 month. In the first half this year, government payments totaled $414,000,000, against $257,000,000 in the 1938 period.

Some crops are smaller this year than last but still are of sufficient size to create surpluses which are reflected in lower average prices. The government's July index of prices received by the farmer for his products was 89, lowest since 1934 and comparing with 95 a year ago.

Corn Crop Down

The corn crop will be relatively large but probably smaller than last year. The western corn belt suffered damage from hot weather, although conditions in the eastern sections have been good. Illinois, for example, has prospects of harvesting the largest corn crop in history. Aug. 1 forecast of the department of agriculture indicates a total national yield of 2,459,888,000 bushels, compared with the 1928-1937 average crop of 2,309,674,000 bushels.

Cotton production for 1939 is estimated by the department of agriculture at 11,000,000 bales. This is about one million bales less than the 1938 crop and nearly 20 per cent below the average for the past ten years. However, the crop reduction is not being offset by a corresponding increase in price. In fact, the opposite is true, which explains the unfavorable situation in cotton states. Closing price of December cotton the middle of this month was 8.65c, slightly higher than the 8.32c market a year ago but 21 per cent below the average price of 10.95c the past ten years.

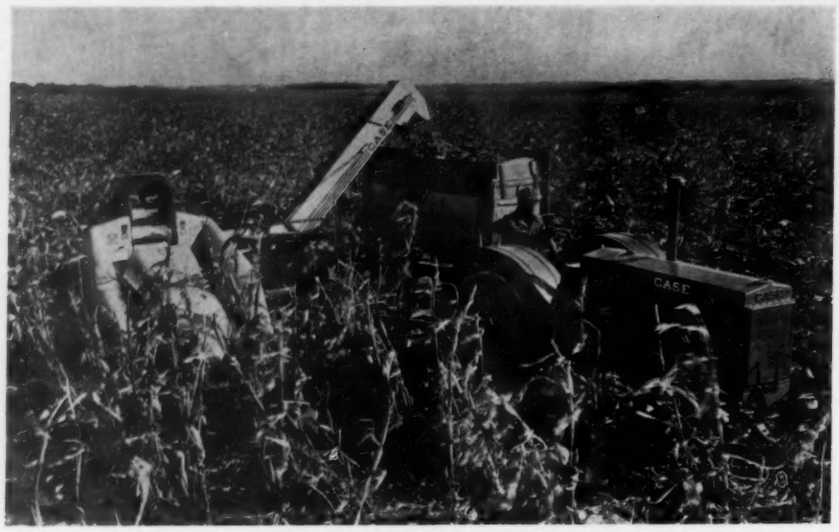
The hog crop this year will be decidedly larger than in 1938. Lambs are expected to be off slightly, with cattle showing little change. Marketings of the latter probably will depend to a certain extent on range conditions.

From the standpoint of farm income, implement and tractor sales would be expected to be well sustained this year, and the experience to date has not been particularly unfavorable. Equipment makers note the deterring influence of declining prices for farm commodities, however, particularly within the past few weeks. A declining market invariably tends to discourage equipment sales.

Export business in tractors and implements also has declined moderately this year, figures for the first half indicating a larger recession than in domestic business. Foreign shipments through June amounted to $41,827,643, compared with $34,912,768 in the 1938 period, a decrease of 16.5 per cent.

Implement manufacturers currently are in a between-season period. Production of fall tools is largely completed and output of spring equipment has yet to get actively under way. Operations of some interests are aided by manufacture of new implements for use

■ Tractors increasingly are becoming the power unit for American farms. Here a new International Harvester Farmall pulls a 4-row corn and cotton planter



■ Corn pickers, drawn by tractors, will make harvesting easier on many farms this fall. Both implements built by J. I. Case Co.

in connection with low-price tractors.

Tractor output, for the past year or two accounting for about 40 per cent of total equipment sales, is being bolstered by the small units introduced a short time ago by several companies, including Ford and International Harvester. Allis-Chalmers, Cleveland Tractor and Deere previously entered the market with low-price tractors. Other tractor interests may bring out similar units.

Spring and fall are the best selling seasons for tractors, although demand is better sustained throughout the year than is the case with most implements. Small tractors are expected to figure prominently in fall business this year and may be instrumental in holding 1939 unit sales, if not dollar volume, close to 1939 figures.

The important sales opportunity opened by the small tractor is in creating a market among farms of limited acreage where the older and larger models cannot be operated economically because of their higher cost. Priced at about $495 to $500 for Allis-Chalmers, $515 for International Harvester and $585 for Ford —their principal appeal is to the operator of the small farm, and at the same time may serve as an auxiliary unit on larger farms without materially curtailing the market for the more powerful tractors. This is in contrast to the competitive situation created in the automobile industry where sales of low-price cars frequently are made at the expense of high-price vehicles.

Droughts of the early 1930's played an important role in eliminating surpluses of various farm commodities and in strengthening prices. Favorable weather in more recent years has restored the old farm problem, despite efforts of the government to curtail crops and lift prices. At the moment nothing appears likely to cause an abrupt about-face in farm prices—except war. Moreover, based on the experience of the last European conflict, grain and livestock quotations would not respond immediately to another major war, consequently a struggle of more than a year's duration would be required to give the farmer the harvest of food and dollars such as he reaped in 1914-1918.

How Farmer Has Fared

	1939*	1938	1937	1936
Cash farm income	74	75	83	75
Domestic sales of farm equipment	73	83	110	90
Prices received by farmers	60	65	84	78
Prices paid by farmers	83	82	85	81

1929 equals 100. *First seven months.

Steel Third Safest Of Major Industries

■ By improving its safety record more than 20 per cent in 1938, the steel industry became the third safest among 30 leading industries, reports the American Iron and Steel institute, on basis of a study of National Safety council records.

In 1937 steel ranked fifth in freedom from accidents, having risen from twelfth place in the preceding three years.

Only the tobacco and cement industries last year reported fewer accidents per million man-hours worked than did the steel industry. Neither of those industries is fully comparable with steel as a producer of many heavy products on a mass-production basis.

Over the past 30 years the frequency of accidents in the steel industry has been reduced about 90 per cent as the result of the intensive safety programs carried on by steel companies. The industry's safety showing in 1938 was nearly 50 per cent better than the general average for major industries as reported by the National Safety council.

For every million man-hours worked in steel mills last year, there were only 6.6 accidents, while in industrial plants generally there were 12.2 accidents per milion man-hours of work. In 1937 the rate of frequency of accidents in the steel industry was 8.5; this compared with the all-industry average of 13.9.

Republic Employes' Share 35 Times That of Owners

■ For each dollar it paid to employes in the first half Republic Steel Corp. earned less than three cents, it is revealed in the current number of *Republic Reports*, a pamphlet issued for employes.

During the first six months of 1939 the company earned a net profit of $1,083,311, compared with a $5,918,881 loss in the corresponding period last year. Gross income for six months this year amounted to more than $94,000,000. How was this distributed?

Scrap costing nearly $10,250,000 was used. More than $8,500,000 went to rail, truck and steamship lines for freight (exclusive of freight on ore and coal). Iron ore consumed cost $7,500,000. Fuel expense was $5,000,000 and power almost $2,500,000. Water bill reached $700,000. For telephone, teletype, telegraph and cable service the firm spent $475,000. Its tax bill required $3,500,000 be set aside. To replace worn out or obsolete equipment $5,509,552 was charged off.

Of its six months' income firm paid wages and salaries exceeding $35,750.000, and retained as profit only $1,083,311. This meant the company earned less than three cents on each dollar employes received.

In the period 1935-1938 inclusive Republic paid in taxes more than its net earnings. Of its $752,196,922 gross income during these years taxes took $24,582,276, while net earning amounted to only $15,088,979.

■ Clark Electrical Equipment Corp. has moved its factory and general offices from Warren, Pa., to 2513-15 Gallatin road, Nashville, Tenn.

Trade Pact Gives Germany Access to Soviet Ore, Oil, Manganese, Chromite

■ RUSSO-GERMAN trade pact announced last week drastically revises Germany's economic position with regard to industrial raw materials and foodstuffs. It also changes Russia's dependency on American machinery and toolmakers, provided, of course, Germany lives up to her part of the bargain and returns machinery and armament materials for Russia's raw material. Possibly, the agreement will affect the competitive position of Germany and the United States in other markets.

Long has it been recognized that Germany and Russia complement each other economically. Russia can absorb German manufactured goods and provide the Reich with raw materials. German technical skill and economic efficiency could develop Russia's untapped reserves of minerals, agricultural capacity, petroleum and timber.

At the same time the accord weakens the influence of the western European democracies, France and Great Britain, over the Reich. Access to Soviet resources should make Germany more immune to a blockade by western powers.

Most critical of Germany's deficiencies in raw materials are iron ore, copper and petroleum, because of the volume required. Russia possesses tremendous resources of iron ore and petroleum and can help Germany in the matter of copper, although in past years Russia's copper production has not equaled consumption. Russia also can adequately supply Germany with manganese and chromite. Greatest difficulty in supplying Germany with ore is transport.

Germany now is producing domestically 33 per cent of its iron requirements and it reached this figure only at frightful cost. Exactly what is this cost is not known but some estimates in America are that pig iron is costing two to three times what it costs here.

To Step Up Iron Output

Germany plans eventually to produce domestically up to 50 per cent of her iron requirements by intensively developing her low-grade ore.

The Reich made a little gain in iron ore through division of Spain's Bilbao deposits. She also made a small gain by absorbing Austria. The latter increase, however, was offset by taking over Czechoslovakia, whose mills at the time were importing ore.

France and Sweden have been the Reich's most important sources of imports.

Of copper Germany has only one low-grade deposit, the Mansfield. Under rearmament pressure, production last year was brought up to about 14 per cent of requirements but at great cost. Copper mined in Germany is costing about 25 cents a pound, compared with a world price of slightly more than 10 cents, estimates C. K. Leith, professor of geology, University of Wisconsin. Russia has not been self-sufficient in copper but has been producing a large portion of her requirements and it is believed her resources could be further developed and output increased.

By exploiting her meager oil resources to the limit the Reich last year produced 38 per cent of requirements. Russia's rich petroleum supplies would be a boon.

How Russia and Germany complement each other is illustrated by the figures in the following table taken from *The Strategy of Raw Materials* by Dr. Brooks Emeny. Figures are based on production and consumption in the late 20's and early 30's before rearmament pressure caused distortion:

Output as Per Cent of Consumption

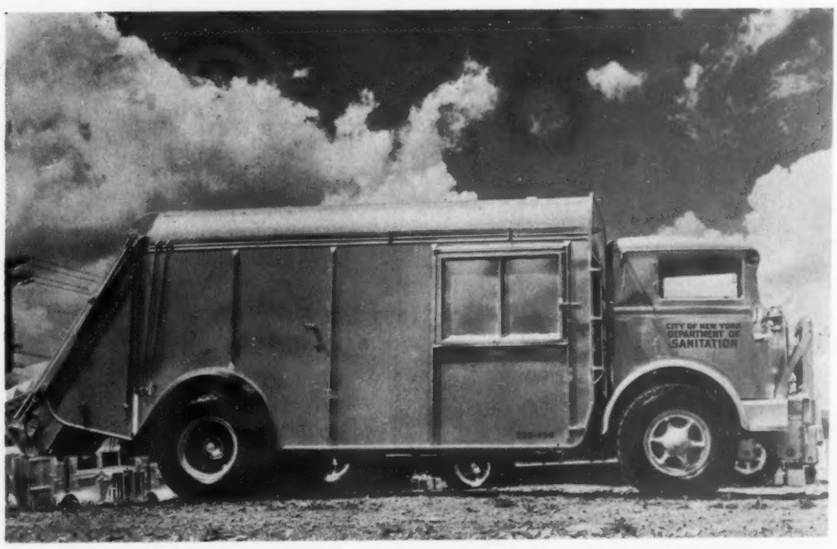
	Germany	Russia
Foodstuffs	78.30	101.13
Iron and Steel	104.18	99.10
Machinery	128.01	63.85
Chemicals	129.07	95.42
Coal	122.75	103.10
Iron Ore	29.87	106.76
Petroleum	5.37	133.56
Copper	11.11	62.04
Lead	28.94	27.58
Nitrates	129.96	37.12
Sulphur and Pyrites	19.37	88.55
Cotton	0	85.56
Aluminum	1.48	24.20
Zinc	60.02	54.26
Rubber	0	0
Manganese	0.07	269.64
Nickel	0	0
Chromite	0	131.61
Tungsten	0.85	0
Wool	9.78	81.54
Potash	148.71	99.34
Phosphates	49.97	86.57
Antimony	0	0
Tin	0	0
Mercury	0	86.46
Mica	0	102.22

Individually Germany and Russia have made tremendous strides in pig iron and steel production during the past decade. They now rate second and third respectively among world producers. Estimated output since 1929:

	—Germany—		—Russia—	
	Steel	Pig Iron	Steel	Pig Iron
	(In thousands of gross tons)			
1938	22,900	18,200	18,000	14,700
1937	19,531	15,703	17,535	14,288
1936	18,900	15,058	16,080	14,088
1935	16,184	12,637	12,320	12,411
1934	11,725	8,602	9,412	10,273
1933	7,690	5,183	6,790	7,085
1932	5,678	3,870	5,900	6,101
1931	8,136	5,964	5,333	4,782
1930	11,354	9,540	5,610	4,920
1929	15,986	13,187	4,828	4,253

The agreement, in which Germany grants the Soviets an $80,000,000

High-Strength Steel for Truck Bodies



■ **New York recently bought 167 of these rubbish trucks for its department of sanitation from Heil Co., Milwaukee and Hillside, N. J. Bodies are made of 12-gage Mayari R steel sheets, Bethlehem Steel Co. product, electrically welded throughout. Trucks are of the enclosed, mechanically-loaded type, have hydraulically-operated twin dumpers. Capacity is 21 cubic yards; maximum load is 9 tons**

credit at 5 per cent interest for seven years, provides that Russia deliver $72,000,000 worth of products within the next two years. It is believed Russia will purchase machinery and armaments from Germany.

Russia last year was the leading market for American metalworking machinery. For the first six months this year the Soviet Union was replaced by Japan, as Russia's metalworking machinery purchases from the United States dropped to $9,776,201 from $16,077,369 in the first half of 1938.

Last year Germany, previously the chief supplier of machinery to Russia, was unable to make deliveries of machinery wanted by Russia, with the result that American sales rose to record heights. However, there is now some indication Germany again is in a position to supply this market and in fact several large Russian orders recently have gone to German firms.

SOVIET-U. S. TRADE AGREEMENT RENEWED

Commercial agreement between the United States and Russia has been renewed and is effective until Aug. 6, next year. As in the two previous similar agreements the Russian government has informed the United States that during the coming 12-month period it will purchase not less than $40,000,000 worth of American goods.

For its part American government undertakes to continue to accord to Russia unconditional most favored nation treatment, with a reservation in respect of coal which is necessary because of the nature of the coal tax provisions of the revenue act of 1932. Under this agreement, therefore, the soviet union will continue to receive the benefits of concessions granted by the United States in trade agreements with countries other than Cuba entered into under the trade agreement act.

WATCHFUL WAITING— SHIPPERS' ATTITUDE

NEW YORK

While the critical European situation has resulted in some speeding up of acceptances of pending quotations, it has not yet resulted in any great increase of fresh inquiry from foreign sources. Both exporters and foreign buyers are marking time. In fact, policy of leading exporters is to withhold as much as possible all new quotations until Monday in the belief that by that time they will know whether or not the present crisis will result in war.

Although there has been some speeding up in acceptances on standing inquiries, this does not imply, exporters assert, that there has been any release of orders here against the 100,000 tons of galvanized sheets and such other outstanding lists as have been reported from time to time from European democracies.

It is assumed that so gigantic and pressing are the problems abroad that these matters resolve themselves into mere details which will unfold in time should developments warrant.

Should war actually develop it is believed it would not be very long before a heavy demand from England and France would materialize. At the same time, demand from neutral countries would temporarily suffer, it is thought, as the foreign exchange might become so unsettled as to make business for a while extremely difficult for the average individual buyer.

MEETINGS

60 PAPERS SCHEDULED FOR WELDING SOCIETY MEETING

■ FIFTEEN technical sessions reviewing the year's progress in welding techniques and applications are planned for the twentieth annual meeting of the American Welding society at the Stevens hotel, Chicago, Oct. 23-27, in connection with the National Metal congress and exposition. Some 60 papers, ranging from fundamental research to field experience, are included in the program.

The society will hold its annual banquet at the Stevens on Oct. 26. An inspection trip to the plant of the Electro-Motive Corp., LaGrange, Ill., is being arranged for the afternoon of Oct. 27. More than 30 companies with products of direct interest to the welding industry will exhibit in the Metal show in International Amphitheater.

BRITISH STEEL INSTITUTE LISTS MEETING PAPERS

Special reports and papers will be presented at the autumn meeting of the British Iron and Steel institute in Cardiff, Wales, Sept. 12-15, as follows: "Ninth Report on Heterogeneity of Steel Ingots," by joint committee of institute and British Iron and Steel Federation; "An X-Ray Investigation of Iron-Rich Nickel-Iron Alloys," by A. J. Bradley and H. J. Goldschmidt; "Niobium-Iron Alloys," by R. Genders and R. Harrison; "Causes of Roll Marks on Tin Plate," by R. Griffiths; "Influence of Steel-Base Composition on Rate of Formation of Hydrogen-Swells in Canned Fruit Tin Plate Containers—Part I," by T. P. Hoar, T. N. Morris and W. B. Adam; "Transformation of Austenite on Cooling, Morphology and Genesis of Aggregates Formed," by H. Jolivet; "Antimony in Mild Steel," by B. Jones and J. D. D. Morgan; "Decarburization of Granulated Pig Iron, the 'R.K.' Process," by Count Bo Kalling and Ivar Rennerfelt; "Effect of Casting Temperature on Primary Microstructure of Cast Irons — Theories of Dendrite Formation and Solidification of Iron-Carbon Alloys," by A. L. Norbury; "Tensional Effects of Torsional Overstrain in Mild Steel," by H. W. Swift.

BRITISH PLAN CONFERENCE ON FLAMES AND FURNACES

An International Conference on Flames and Furnaces will be held at the Royal Institution, London, Sept. 17-20, 1940. Sponsored by the Institute of Fuel, 53 Victoria street, London S.W.1, the conference will be organized by the British Coal Utilization Research association. One purpose is to bring new developments in scientific study of the flame by methods of chemical kinetics and spectroscopy to notice of engineers and industrialists with a view to accelerating practical application.

It is proposed to organize the conference so that authors of papers will collaborate in covering the whole ground of flame and furnace research with a minimum of duplication and overlap. Selected authors throughout the world will be asked to contribute papers on specified problems.

BRITISH METALS INSTITUTE IS MEETING IN GLASGOW

Glasgow, Scotland, will be host to the Institute of Metals of Great Britain for the third time when the organization conducts its thirty-first annual autumn meeting there, Sept. 5-8. Previous visits to this city took place in 1910 and 1925. Headquarters for the 1939 meeting will be at the Institution of Engineers and Shipbuilders.

The first of two technical sessions, on Sept. 6, will feature presentation of seven papers dealing with the chemical analysis, structure and physical properties of nonferrous metals; the second, on Sept. 7, will be devoted to a general discussion of "machinability." W. Murray Morrison will present the seventeenth autumn lecture on "Aluminum and Highland Water Power."

REINFORCING STEEL GROUP TO MEET IN HERSHEY, PA.

Concrete Reinforcing Steel institute will conduct its semiannual meeting at Hotel Hershey, Hershey, Pa., Sept. 14-16. Afternoon sessions are scheduled for the first two days; a golf tournament for the morning of the third day. H. C. Delzell, Builders building, Chicago, is executive secretary.

LABOR

EMPLOYES' GROUP SEEKS TO AID REPUBLIC IN CIO CASE

■ CENTRAL Council of Steel Plants, claiming to represent 50,000 of the 60,000 employes in Republic Steel Corp.'s Ohio plants, last week accused the national labor relations board of "gross abuse of discretion" in refusing to hear its testimony in the Republic-Steel Workers' Organizing committee dispute now pending in United States Circuit Court of Appeals.

Council filed a supplemental brief supporting the company's appeal against an NLRB order favoring CIO and directing reinstatement of 5000 unionists who took part in the 1937 strike. Brief charges the board dismissed the council's petition for a hearing, denied an opportunity to prove in court that it and not CIO represented a majority of workers involved and under the law should be recognized as their bargaining agent.

INLAND CHARGES NLRB HEARINGS WERE UNFAIR

Inland Steel Co. last week filed a new brief with federal Circuit Court of Appeals petitioning national labor relations board's order requiring it to disestablish an independent union be set aside on grounds it had been denied a fair hearing.

Company contended hearings were prejudicial and coercive, charged the board's trial examiner, Charles A. Wood, was "dictatorial, sneering and contemptuous." Case has been pending since last November when Inland appealed from an NLRB ruling directing it to dissolve Steel Workers' Independent Union Inc. and deal with the CIO's Steel Workers' Organizing committee. Original complaint was filed by SWOC in 1937 following disputes at firm's plants in Chicago Heights, Ill., and Indiana Harbor, Ind.

Steelworkers' Efficiency, Wages Above Average

■ Productive efficiency of the wage-earning employes of the steel industry is substantially greater than the average productivity of all other industrial workers. A study by the American Iron and Steel institute of the federal census of manufactures for 1937 shows that in the steel industry the net value of production amounted to $3240 per worker, as against $2920 per worker in all other industries.

Moreover, because of the high level of wages in the steel industry wages paid per dollar of net value of goods produced by steelworkers is fully 28 per cent more than the average for all other industries.

The more than 500,000 steelworkers employed in 1937 increased value of the raw materials furnished them by $1,625,000,000.

The high degree of mechanization in the steel industry has contributed greatly to the efficiency of steelworkers. The year 1937, in which steel employment set new high records, was the culmination of a period of exceptional activity in the development and installation of technological improvements in the steel industry.

Hourly steel wages in 1937 averaged nearly 18 per cent above the average industrial wage. Compared with the steel industry's figure of 50 cents in wages paid per dollar added by manufacture, all other industries paid an average of 39 cents in wages.

Firm Shows Workers How Earnings Affect Them

■ How company operations affect the worker is graphically and simply portrayed by Clark Equipment Co., Buchanan, Mich., in President E. B. Clark's report to employes, just issued for 1938. Every figure in the incorporated financial statement is reduced to an amount per employe.

Firm received from customers during the year $4544 per employe. Distribution of each dollar in income: Materials, 41 cents; wages, 34 cents; repairs and depreciation, 11 cents; taxes, insurance and development, 7 cents; fuel and electricity, 3½ cents; and profits, 3½ cents.

Significance of the phenomenal growth of the company's tax bill during recent years was brought home by showing the annual tax expense per shop hour. Amounting to but 4½ cents in 1936, this item soared to 10 cents in 1937 and 11 cents in 1938.

Report pictures all Clark plants, its products and manufacturing processes, takes a special bow to 212 veterans who have served 20 years or more.

Government Asks Bids on 13,750 More Steel Bins

■ Department of agriculture, Washington, has called for bids Aug. 30 on 13,750 steel bins with aggregate storage capacity for 25,000,000 bushels of shelled corn. They will require approximately 14,000 net tons of galvanized sheets. The department recently placed contracts amounting to $3,611,520 for 25,000 bins requiring 24,000 tons of sheets and angles.

$10,000,000 for Steel Research

■ APPROXIMATELY $10,000,000 is being spent this year by the steel industry for research into methods of improving its products and manufacturing processes, and to develop new products, according to a survey by the American Iron and Steel institute.

Industry's research programs for 1939 are about as intensive as those conducted in any previous year for which data are available.

Total estimated expenditure for research this year is nearly half a million dollars more than was spent in 1938, and is 15 per cent more than the $8,700,000 spent in 1929. In 1937 steel companies spent $10,300,000 for research work, the largest sum on record.

Nearly 2550 chemists, metallurgists, physicists and other trained scientists devote all of their time to research in the industry's laboratories, while about 1300 others devote a substantial part of their time to research activities.

In addition to the annual out-of-pocket costs of research, the industry has invested more than $9,000,000 in the equipment and facilities of the laboratories used by research workers. The investment in research equipment has increased about $3,000,000 within the past three years as new instruments and facilities were added to laboratories.

About 33 per cent of the steel industry's annual expenditures for research is devoted to improving the quality of products, and 19 per cent is spent to improve manufacturing methods.

New product development represents about 20 per cent of the research activity, and the remainder is spent to investigate new uses for standard products and to study uses for new products.

Rail Equipment Loans Planned by Brazil

■ Brazilian government soon will loan $3,500,000 to two railroads in that country for the purchase of locomotives and other equipment, it is reported to the department of commerce.

Leopoldina Railway Co. Ltd. is to receive about $1,500,000 and the Great Western of Brazil Railway Co. about $2,000,000. Funds are intended for purchasing locomotives, rails, roadbed and bridge materials, shop and maintenance equipment. Loans are to be made in annual installments beginning next year, and their expenditure will be supervised by the transportation ministry.

July Exports Off 13.8 Per Cent

■ EXPORTS of iron and steel products in July, excluding scrap, totaled 163,598 gross tons, 13.8 per cent less than June shipments of 189,968 tons, according to metals and minerals division, bureau of foreign and domestic commerce. Aggregate for seven months this year is 1,086,873 tons, compared with 1,254,710 tons in the corresponding period in 1937.

Tin plate exports were 22,264 tons, compared with 25,718 tons in June but in spite of this decline remained the leading export item. Steel plates declined from 25,507 tons in June to 13,930 tons in July and pig iron from 7689 tons to 6021 tons. Non-alloy ingots showed an increase from 8402 tons in June to 9672 tons in July and reinforcing bars from 2756 tons to 3257 tons. In most classifications changes were small.

Scrap exports in July were 350,066 tons, compared with 398,888 tons in June, a loss of 42,822 tons. Scrap exports for seven months this year totaled 2,139,018 tons, compared with 1,924,736 tons in the same portion of 1937.

UNITED STATES EXPORTS OF IRON AND STEEL PRODUCTS

Gross Tons

Articles	July 1939	June 1939	January thru July 1939
Pig iron	6,021	7,689	33,954
Ferromanganese and spiegeleisen	147	2	185
Other ferroalloys	135	293	812
Ingots, blooms, etc.			
Not containing alloy	9,672	8,402	58,836
Alloy, incl. stainless	8	252	6,616
Steel bars, cold fin.	224	414	3,986
Bars, iron	62	43	373
Bars, concrete	3,257	2,756	16,904
Other steel bars:			
Not containing alloy	11,311	11,308	65,816
Stainless steel	19	5	212
Alloy, not stainless	432	1,045	7,826
Wire rods	3,706	3,564	14,309
Boiler plate	562	156	3,370
Other plates, not fab.:			
Not containing alloy	13,930	25,507	141,317
Stainless steel	11	4	51
Alloy, not stainless	312	285	999
Skelp iron or steel	3,584	1,009	8,221
Sheets, galv. iron	748	298	3,411
Sheets, galv. steel	9,201	7,948	52,723
Sheets "black" steel:			
Not containing alloy	19,519	20,137	151,944
Stainless steel	119	63	552
Alloy, not stainless	398	164	1,943
Sheets, black iron	546	561	3,883
Strip steel, cold-rolled:			
Not containing alloy	1,331	1,374	10,783
Stainless steel	120	55	411
Alloy, not stainless	21	31	252
Strip steel, hot-rolled:			
Not containing alloy	3,339	3,605	27,536
Stainless steel	67	3	218
Alloy, not stainless	6	15	36
Tin plate, taggers' tin	22,264	25,718	121,219
Terneplate	348	386	2,277
Tanks, except lined	2,445	4,763	16,006
Shapes, not fabricated	10,078	10,030	51,747
Shapes, fabricated	1,993	3,226	18,040
Plates, fabricated	299	1,157	2,390
Metal lath	101	83	578
Frames and sashes	51	85	553
Sheet piling	439	1,119	3,374
Rails, 60 lbs.	2,277	5,243	27,084
Rails, under 60 lbs.	715	470	2,304
Rails, relaying	2,565	3,223	9,277
Rail fastenings	664	1,272	5,301
Switches, frogs, crsgs.	148	237	1,443
Railroad spikes	133	159	1,806
R.R. bolts, nuts, etc.	99	115	880
Boiler tubes, seamless	546	822	4,037
Boiler tubes, welded	9	31	257
Pipe:			
Smls. casing, oil-line	3,292	4,829	33,912
Do., welded	817	188	2,134
Seamless black	577	740	4,317
Pipe fittings:			
Mall. iron screwed	346	344	2,147
Cast-iron screwed	204	367	1,394
Pipe and fittings for:			
Cast-iron pressure	857	3,798	13,219
Cast-iron soil	752	883	4,507
Pipe, welded:			
Black steel	1,535	1,486	9,847
Black wrought-iron	545	100	1,989
Galvanized steel	1,277	1,504	11,814
Galv. wrought-iron	234	400	1,769
*All other pipe, fittings	644	526	2,712
Wire:			
Plain iron or steel	2,100	2,346	14,706
Galvanized	1,944	3,028	14,866
Barbed	4,627	4,871	24,444
Woven-wire fencing	164	268	1,698
Woven-wire screen cloth:			
Insect	41	26	252
Other	84	123	785
Wire rope and cable	319	212	2,213
Wire strand	86	43	546
Electric welding rods	142	185	890
Card clothing	2	...	26
Other wire	573	1,059	4,400
Wire nails	1,890	2,035	11,140
Horseshoe nails	73	67	501
Tacks	18	30	150
Other nails, staples	434	482	2,387
Bolts, machine screws	630	719	4,625
Castings:			
Gray-iron (incl. semisteel)	276	317	2,033
Malleable iron	37	41	601
Steel, not alloy	106	128	631
Alloy, incl. stainless	219	123	956
Car whls., tires, axles:			
†Wheels and tires	812	556	5,680
†Axles, no wheels	2,142	917	6,773
†Axles with wheels	511	1,081	3,045
Horseshoes and calks	2	5	127
Forgings, n.e.s.:			
Not containing alloy	1,324	666	6,296
Alloy, incl. stainless	64	348	1,290
Total	163,598	189,968	1,086,873
Scrap, iron and steel	347,249	397,321	2,123,264
Scrap, tin plate	1,261	282	5,561
Tin plate circles, strips, cobbles, etc.	969	450	4,476
Waste-waste tin plate	587	835	5,717
Total scrap	350,066	398,888	2,139,018
GRAND TOTAL	513,664	588,856	3,225,891
Iron ore	158,227	79,064	359,559

*New class. Includes flanged malleable cast-iron fittings, expansion joints, and riveted pipe and fittings.
†New class.

July Farm Equipment Exports Drop Slightly

■ Seasonal decline was recorded by exports of farm equipment during July, shipments amounting to $6,991,805, off 8 per cent from the $7,632,848 in that month last year, reports the machinery division, department of commerce.

While foreign sales of combines during July were well ahead of 1938, totaling $1,415,523 against $1,128,371, the gain was more than offset by decreases in other types. Tillage implements showed a 27 per cent loss and seed separator shipments were off 31 per cent, while exports of tractors, parts and accessories dropped 12 per cent.

Industrial Machinery Exports Up 17% in July

■ American exports of industrial machinery during July amounted to $24,560,369, gaining 17 per cent over the $20,948,548 shipped in the same month last year, according to the machinery division, department of commerce. Although improvement was experienced in many types, major increases were recorded by construction, conveying and metalworking machinery. Mining, petroleum and pumping equipment showed lower foreign sales.

For seven months this year United States machinery exports aggregated $165,944,735, compared with $163,164,896 for the like period last year. Power-driven metalworking machines and miscellaneous types have shown substantial gains over 1938 thus far this year.

Shipments improved during July in virtually every class of metalworking machinery. Power-driven metalworking machines gained 44 per cent over last year, amounting to $9,358,876 against $6,488,415. Exports of metalworking equipment other than power-driven also rose, totaling $340,843 in July, compared with $338,223 during that month in 1938.

Orders, Shipments Rise; Inventories Decline

■ New orders, shipments and unfilled orders advanced during June for the second consecutive month, according to a National Industrial Conference board survey.

Inventory value, reported by 144 concerns, declined 1 per cent in June, compared with a 1 per cent advance in May, and was 14 per cent lower than a year ago. At the end of June stocks were equivalent to three months' shipments, compared with three and a half months' shipments in May. A year ago, stocks were equal to four and one-half months' shipments.

Changes in value of various operating factors:

	Per cent change from May, 1939	June, 1938
Inventories	− 1	−14
Shipments	+ 4	+29
New orders	+ 5	+37
Unfilled orders	+ 3	+18

Board's indexes of physical volume of inventories in manufacturers' hands moved slightly downward in June, as follows:

	June* 1939	May† 1939	June 1938
Raw materials	94.7	96.4	113.7
Semifinished goods	112.6	113.7	121.5
Finished goods	109.4	109.6	113.4

* Preliminary. † Revised.

Activities of Steel Users, Makers

■ DETROIT Ball Bearing Co. of Ohio has become successor to the Ohio Ball Bearing Co. of Toledo. This firm, which specializes in antifriction bearings and devices, will continue to operate in the 16 counties of the northwestern part of Ohio. G. E. Binkelman, formerly with the Timken Roller Bearing Co., Canton, O., has been made manager of the Detroit Ball Bearing organization in Toledo, O.

♦

Youngstown Sheet & Tube Co., Youngstown, O., has established a branch office at 914 Hubbell building, Des Moines, Iowa, to serve Iowa and Nebraska.

♦

Davis Fire Brick Co., Oak Hill, O., has removed its Pittsburgh office to 430 Grant building. District sales remain in charge of Douglas K. Ballard.

♦

Allied Engineering Co., Cleveland, division of Ferro Enamel Corp., Cleveland, has contract for four new tunnel-type kilns for the Bengal Potteries at Calcutta, India.

♦

Allis-Chalmers Mfg. Co., Milwaukee, has moved its district office in Chattanooga, Tenn., of which D. S. Kerr is manager, to new quarters in the Chattanooga Bank building, 737 Market street.

♦

Hibbard, Spencer, Bartlett & Co., Chicago, hardware wholesaling company, has arranged to acquire the assets of the H. Channon Co., Chicago distributor of mill machinery and hardware supplies. The purchase is subject to approval of 95 per cent of Channon's stockholders by Sept. 1.

♦

General American Transportation Corp., Chicago, has acquired the motor coach division of Gar Wood Industries Inc., Detroit, which marks the second step the company has taken this year toward diversification of its activities. In March it acquired a controlling interest in the Barkley-Grow Aircraft Co. The new unit, for the present to be operated as a division, will be transferred to Hegewisch, Ill., and heads of the former bus division of Gar Wood Industries will become associated with the car building corporation, continuing in charge of activities at the new location.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Aug. 26	Change	Same week 1938	Same week 1937
Pittsburgh ...	56	None	33	83.4
Chicago	56	— 2	37.5	86.5
Eastern Pa. ...	44	+ 1	30	65
Youngstown ..	55	None	45	73
Wheeling	86	None	54	89.5
Cleveland	80	— 3.5	41	79.5
Buffalo	60.5	+ 2.5	46.5	86
Birmingham ..	75	None	53	96
New England..	70	None	50	60
Cincinnati	63	+ 3	65	93
St. Louis.....	57	None	33	84
Detroit	82	None	60	100
Average	63.5	None	43.5	83

Offer $500 for Papers On Instrumentation

■ Twelve prizes totaling $500 will be awarded for the best original reports or essays submitted in the second annual instrumentation contest held by the industrial instrument section of Scientific Apparatus Makers of America.

Restricted to persons not employed by an instrument manufacturer, contest permits entrants to write on one of two themes: "Instruments Save Money"; or "Instrumentation Makes Jobs."

Contest closes Nov. 15 and will be judged by a jury including C. S. Redding, president, Leeds & Northrup Co.; H. B. Richmond, treasurer, General Radio Co.; T. P. Sprague, president, Hays Corp.; L. G. Wilson, president, Precision Thermometer & Instrument Co.; F. K. Taylor, vice president, Taylor Instrument Co.; Clemann Withers, treasurer, Sperry Gyroscope Co.; and M. F. Behar, editor, *Instruments*.

Rules and entry forms may be had from Scientific Apparatus Makers of America, 20 North Wacker drive, R.3014, Chicago.

Steel Companies Buy 4,000,000 Pencils Annually

■ Nearly four million lead pencils and 2600 gallons of ink per year are used by by steel industry employes as they do the great volume of paperwork required in connection with making and selling steel, the American Iron and Steel Institute has estimated.

That they make mistakes once in a while is indicated by the fact that they use nearly 140,000 erasers a year.

Pencils, ink and erasers are only minor items, however, in the steel industry's annual bill of $2,600,000 for miscellaneous office supplies.

PRODUCTION

■ STEELWORKS operations last week held steady at 63.5 per cent. Seven districts showed no change, three made small advance and two registered a loss. A year ago the rate was 43.5 per cent; two years ago 83 per cent.

Youngstown, O. — Continues at 55 per cent for third week, two open hearths being added and two taken off for repair.

Birmingham, Ala.—Holds at 75 per cent, with 17 open hearths in production.

Buffalo—Rebounded 2.5 points to 60.5 per cent, balancing loss of previous week. Relighting of an open hearth after repairs brought the rate back.

Cincinnati—Increase of 3 points to 63 per cent, with the same schedule expected this week.

Chicago—Down 2 points to 56 per cent on reductions by practically all interests.

St. Louis—Unchanged at 57 per cent, with some increase scheduled for this week.

Cleveland—Decline of 3.5 points to 80 per cent followed dropping of one open hearth and slight reduction in bessemer output.

Pittsburgh—Changes in schedule by various producers left the district rate at 56 per cent, the same as the preceding week. A higher rate is forecast for this week.

Central eastern seaboard — Advance of 1 point to 44 per cent, as result of August business at least 15 per cent above July.

Detroit—Steady at 82 per cent with 20 open hearths in operation, expected improvement last week failing to materialize.

New England—For third consecutive week at 70 per cent.

Wheeling—Remains at 86 per cent with no indication of change this week.

River Shipments Larger

■ July river shipments in the Pittsburgh district gained for the third consecutive month and, except for Monongahela river tonnage, were the highest for the year. Moderate gains were made in movement of iron and steel. Comparisons follow:

Steel Products

	July 1939	June 1939	July 1938
Allegheny	2,900	2,000	2,520
Monongahela ..	68,000	53,700	43,450
Ohio	131,200	114,000	77,850

All Products

	July 1939	June 1939	July 1938
Allegheny ..	241,900	229,570	246,120
Monongahela	1,703,500	1,687,500	1,141,200
Ohio	1,400,400	1,265,400	754,700

MEN OF INDUSTRY

■ JOHN G. MUNSON has been elected vice president, raw materials, United States Steel Corp. of Delaware, Pittsburgh. He succeeds Thomas Moses who retired Aug. 18 upon reaching the corporation's retirement age, 70. Mr. Moses will continue in a consulting capacity. Mr. Munson has been president, Michigan Limestone & Chemical Co. since 1928, with which as operating manager he began in 1919 the association with United States Steel subsidiaries.

Born in Bellefonte, Pa., in 1885, Mr. Munson received his B.S. degree at Yale in 1905. During the next year he served as a rod man in connection with tunnel construction in Washington; from 1906 to 1908 was superintendent of water supply construction in New Haven, Conn., and sewage disposal construction at Baltimore; in 1909 became superintendent, J. G. White Engineering Corp., a position he held until 1919 when he joined the Michigan Limestone company.

Mr. Moses, who has spent his entire business career in the coal mining industry, has been associated with Steel corporation subsidiaries since 1927 when he was elected president, H. C. Frick Coke Co., United States Coal & Coke Co. and other coal producing subsidiaries. When the Delaware corporation was formed in January, 1938, he was elected a director, member of the executive committee and vice president of raw materials.

♦

Robert N. Yates, for a number of years in the sales department, Erie Foundry Co., Erie, Pa., has been made assistant sales manager.

♦

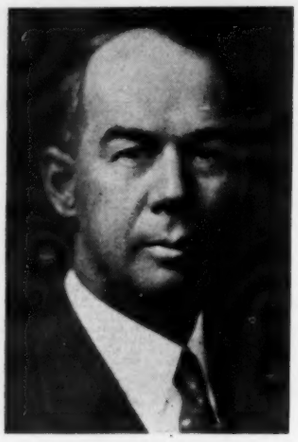
Walter P. Cahill has resigned as general superintendent and member of the board, Graton & Knight Co., Worcester, Mass. He had been with the company about 20 years.

♦

Putnam L. Pitcher has retired as special steam turbine inspector, Allis-Chalmers Mfg. Co., Milwaukee, after 51 years of service. He has been succeeded by his son, Harry G. Pitcher, who has served about 25 years with the company.

♦

Fred G. Gronemeyer, resident engineer, Springfield, Mass., plant of the plastics division of Monsanto Chemical Co., St. Louis, has been promoted to plant manager. He joined the company in May, 1929, as a plant maintenance and construction engineer; in 1935 was transferred to the research department as a development engineer, and in July, 1938, was sent to Springfield as development engineer.



John G. Munson

♦

H. E. Billington has been elected executive vice president, Kellogg Switchboard & Supply Co., Chicago. He joined the company as manager of telephone sales in 1927, in 1931 became general sales manager, and in 1937 vice president in charge of sales.

♦

Martin C. Hausman, steel buyer and assistant to the purchasing agent, Electro-Motive Corp., La Grange, Ill., has resigned, effective Sept. 1, to enter private law practice. He is at present a director, Steel Club of Chicago.

♦

Arthur N. Vogt, associated with Youngstown Sheet & Tube Co., Youngstown, O., six years and since the development of Yoloy high tensile steel, in charge of sales for this product, has been appointed district sales manager at Youngstown. Prior to his association with Youngstown Sheet & Tube, Mr. Vogt was with Associated Alloy Steel Co., Cleveland, for three years, and the Central Alloy Steel Co., Massillon, O., for 12 years.

Arthur N. Vogt

♦

Capt. H. A. Thorndike, former head of the export department, H. D. Hudson Mfg. Co., Chicago, maker of precision water well equipment, has been appointed general manager of the Hudson manufacturing unit at Oshkosh, Wis. He succeeds K. A. Hudson.

♦

Ernest A. Dunbar, for many years assistant west coast manager for Taylor-Wharton Iron & Steel Co., representing that firm in the California gold dredging fields, has resigned to become assistant resident manager, Yukon-Pacific Co. He will be located at Kuala Lumpur, Federal Malay States.

♦

Edmund B. Barnes, the past three years on the Kelvinator advertising staff, Nash-Kelvinator Corp., Kenosha, Wis., has been promoted to district sales manager in the area embracing Cleveland, Pittsburgh, Cincinnati, Columbus, O., and Louisville, Ky. He will make his headquarters in Detroit.

♦

R. C. Allan, formerly sales manager, Stromberg Carburetor division of Bendix Aviation Corp., South Bend, Ind., has been made sales manager, Zenith Carburetor division. G. C. Fricke has been made plant manager of Zenith Carburetor division to replace V. W. Heftler, resigned.

♦

Frank S. Capello, mechanical expert, who entered the employ of General Electric Co., Schenectady, N. Y., in 1892, has retired from active service. He served the company continuously except for three years spent in government employ. The past 15 years he has been attached to the staff of the general superintendent, Schenectady works. During his long and varied experience with General Electric, he has perfected hundreds of jigs, fixtures, and tools.

♦

C. T. Price, vice president in charge of sales, Compressed Industrial Gases Inc., Chicago, has been appointed vice president and general manager. Other personnel changes include: F. M. Wyman as general sales manager; R. G. Wilson, assistant general sales manager; P. G. Wesley, of Philadelphia, in charge of the medical gas sales division; A. H. Steinbrecher, in addition to his duties as vice president, will also serve as assistant

general manager in charge of production; H. B. Pearson Jr., advanced to secretary-treasurer, and G. R. Kall, is the new general accountant.

♦

Joseph D. Burke, formerly director of truck sales, Dodge division of Chrysler Corp., has been named vice president in charge of sales, Federal Motor Truck Co. K. M. Schaefer will continue as general sales manager of Federal.

♦

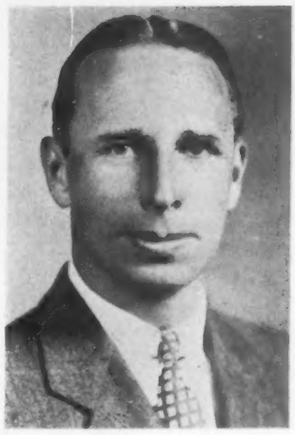
W. H. Spencer has been appointed manager, foundry division, Wilkening Mfg. Co., Philadelphia, maker of Pedrick heat-shaped piston rings. A graduate of Vanderbilt university in 1926, he first joined American Cast Iron Pipe Co., Birmingham, Ala., as metallurgist, remaining with that firm through 1934, with the exception of one year which he spent with the University

W. H. Spencer

of Illinois as foundry superintendent. He then joined the Sealed Power Corp., Muskegon, Mich., as metallurgist, later becoming technical director, from which position he resigned to join the Wilkening company. Mr. Spencer is a member, American Foundrymen's association, and Society of Automotive Engineers, and is at present vice chairman, gray-iron divisional committee, American Foundrymen's association.

♦

J. Douglas Darby, associated with the steel industry in operating and sales capacities for 19 years, has been appointed manager of sales, Philadelphia district, Carnegie-Illinois Steel Corp. He will have his headquarters in Broad Street Station building. Following service as a lieutenant in the army during the World war and graduation from Yale university in 1919, he was employed in the open-hearth department of Alan Wood Steel Co. He



J. Douglas Darby

subsequently became general superintendent, steel division, and assistant to the vice president in charge of sales.

♦

W. E. Kercheval has been placed in charge of the newly established branch office in Louisville, Ky., for Allis-Chalmers Mfg. Co., Milwaukee. B. L. Margeson, formerly in charge of the company's Rockford, Ill., office, has been placed in charge of the new branch office opened in LaPorte, Ind. He has been succeeded at Rockford by J. J. Breutzman, formerly with the company's Chicago office. A. B. Frost has been appointed branch manager at the New Haven, Conn., office to succeed E. D. Hill, resigned.

♦

T. F. Wilson has been appointed Pacific coast district manager for Bastian-Blessing Co., Chicago, maker of soda fountain freezers, carbonators, and weeding apparatus, with headquarters in Los Angeles. Frank DeLarzelere, formerly vice president and general manager, National Butane Gas Co., Memphis, Tenn., has joined Bastian-Blessing as district manager, with headquarters in Columbus, O. Harold L. Norway, the past several years an engineer for the gas and oil department, Underwriters' Laboratories, has been named assistant engineer, liquefied petroleum gas division of Bastian-Blessing.

DIED:

■ C. R. ELLICOTT, 54, the past three years general manager, Cambria plant, Bethlehem Steel Co., Johnstown, Pa., in Baltimore, Aug. 22. Following graduation from Lafayette college in 1908, Mr. Ellicott joined Bethlehem as a chemist at the Bethlehem plant. In 1913 he was named superintendent of No. 1 open hearth, and later became successively, superintendent of open hearths No. 1 and No. 3, superintendent of hot metal division, superintendent of furnaces and alloy mills, and in 1928 was transferred to Cambria plant as assistant general manager.

♦

Eric P. Barfield, chairman and managing director, Wild-Barfield Electric Furnaces Ltd., Elecfurn works, London, N.7, England, Aug. 7 in that city.

♦

John Carlson, 79, engineer, and formerly with the E. W. Bliss Co., Aug. 15 at his home in Brooklyn, N. Y.

♦

Otto Kroeger, assistant manager of sales in Buffalo for the American Steel & Wire Co., from 1930 to 1938, in Texas recently.

♦

Lawrence J. Bradford, 54, treasurer, Lunkenheimer Co., Cincinnati, in Cincinnati, Aug. 21. He had been with the company many years, first as bookkeeper.

♦

Benjamin Wilson, 58, since 1918 assistant to the vice president in charge of operations, American Car & Foundry Co., New York, Aug. 16 in that city. He had been with the company 40 years.

♦

Edward J. Connolly, president, Hayes Body Corp., Grand Rapids, Mich., Aug. 20. He had been a director of the corporation since 1929 and was elected president last May, after serving as executive vice president for several years.

♦

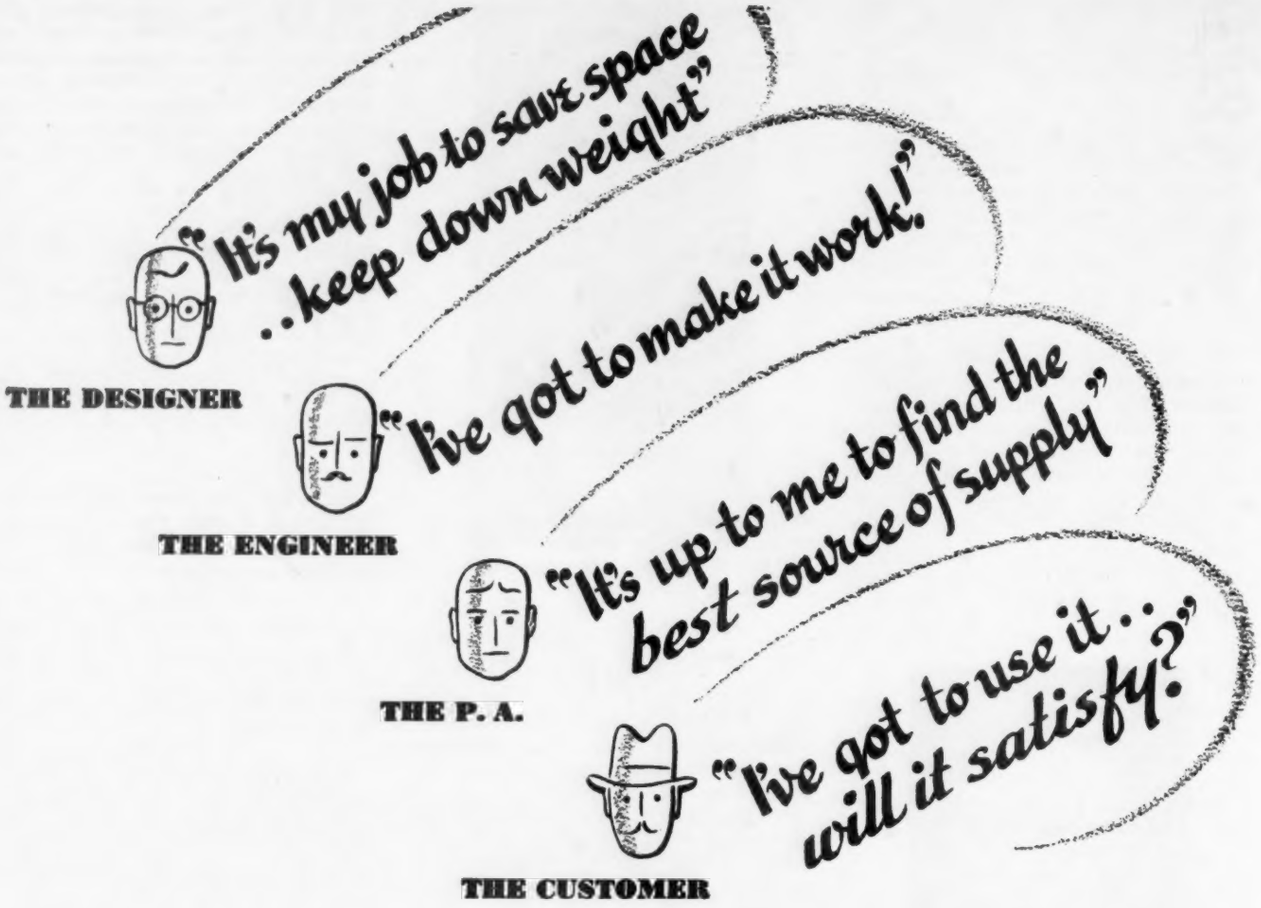
Fred W. Soderberg, 59, vice president and a director, International Harvester Export Co., Chicago, Aug. 18. He lived in La Grange, Ill., the past 40 years, and had been with the export company 42 years.

♦

William H. Cairney, 56, president, Cairney Engine & Boiler Works Inc., Stapleton, S. I., Aug. 17 in New York. Before establishing his own firm in 1934, Mr. Cairney was general superintendent, Morse Drydock & Repair Co., Brooklyn, N. Y.

♦

Lawson H. Whiteside, of the Michiana Products Corp., Michigan City, Ind., in an automobile accident near Chicago, Aug. 3. Mr. Whiteside joined the Rich Tool Co., Chicago, in 1912, which later was taken over by the Michiana Products Corp. He represented the organization as sales executive in the Chicago area for many years, and the past four years served as sales manager.


"It's my job to save space ..keep down weight"
THE DESIGNER
"I've got to make it work!"
THE ENGINEER
"It's up to me to find the best source of supply"
THE P. A.
"I've got to use it... will it satisfy?"
THE CUSTOMER

When all four agree the result is not always the cheapest part . . . nor the most expensive part . . . BUT THAT PART WHICH DOES BEST the things required of it.

BARNES-MADE SPRINGS are made with a sympathetic ear to the customer's problem . . . and an eye to his assembling costs.

You'll find BARNES-MADE PRODUCTS in chain-store merchandise . . . in Production Lines of automobile makers . . . refrigerator manufacturers . . . even in priceless laboratory equipment.

Knowing how GOOD to make it is just as important as knowing HOW to make it.

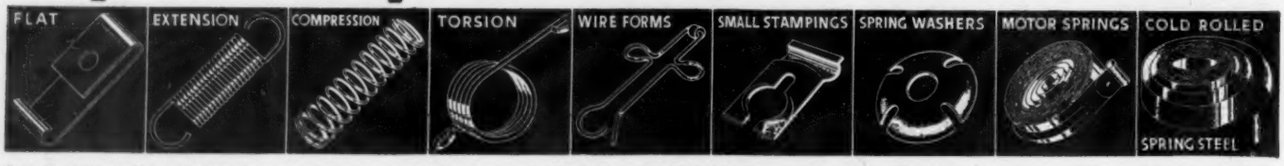
Next time and forever after "GET A BARNES QUOTATION"

Springs

The Wallace Barnes Company

DIVISION OF ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT



SPRINGMAKERS FOR MORE THAN THREE QUARTERS OF A CENTURY

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ COMMERCE department last week announced establishment of a new division of industrial economics. Such an organization has been talked about for several years, but the new setup is not as it was originally proposed.

While it had been hoped the division might get as much as $1,000,000 for its work, only about $100,000 is actually available this year. New unit is not a part of the bureau of foreign and domestic commerce but is directly under Secretary Harry L. Hopkins and will be responsible to his office. Richard V. Gilbert, public finance expert, will be its head.

It is reported the division will be assigned to various specific jobs as they develop. Its staff probably will consult with representatives of business and other government departments while these jobs are in progress. Primary purpose, it is said, is to bring improvement in fields where business progress is retarded.

Secretary Hopkins states "establishment of this industrial economics division will be a forward step in finding practical solutions to our problems and in promoting recovery. As I have said previously, I look upon the department of commerce as the federal agency concerned with everything that concerns business—and particularly its relationship with the various governmental units."

FEDERAL APPEAL IN STEEL WAGE CASE UNCERTAIN

Labor department's legal experts have not yet decided whether they will appeal to the United States Supreme Court for a review of the preliminary decision handed down three weeks ago by the Court of Appeals of the District of Columbia in the steel wage case.

Officials explain an appeal to the high court depends entirely on the final ruling of the circuit court when it is finally made public. Tentative decision was in the nature of a court order, and it was then indicated a two-to-one decision would be rendered shortly remanding the whole question back to a lower court.

As the situation now stands the public contracts board is still enjoined from putting the proposed minimum steel wages into effect under the Walsh-Healey act.

SPEEDING PROGRAM FOR STRATEGIC MINERALS

Procurement division of the treasury department is accelerating its program for purchasing $10,000,000 worth of strategic minerals as provided during the recent session of congress.

Total appropriation was for $10,500,000 for the present fiscal year. Of the supplementary $500,000, bureau of mines received $350,000 and geological survey $150,000, both for "investigation, testing and development" of strategic minerals.

It is expected the materials to be acquired for stockpiles will include large quantities of manganese and other needs.

WOOD BECOMES BUSINESS AIDE TO SECRETARY HOPKINS

Dudley P. K. Wood, New York, assistant vice president of American Machine & Foundry Co., has been named to Secretary of Commerce Hopkins' staff of business experts. He will work to promote Latin American trade.

A Harvard graduate, Mr. Wood entered the service of American Machine & Foundry in 1930 in the domestic sales of cigar machinery. In 1937 he was elected a director of the firm, and this year became a director of International Cigar Machinery Co. Mr. Wood gave up all his business connections to become associated with the commerce department.

James W. Young, recently appointed director of the bureau of foreign and domestic commerce of the department of commerce, will be sworn in Sept. 1. Directorship has been vacant since Alexander V. Dye went to London six months ago as commercial attache.

ICC RENDERS DECISION IN PIPE FREIGHT CASE

Decision was rendered last week by the interstate commerce commission in connection with the wrought pipe and fittings investigation dealing with the ocean-rail rates to and from the Southwest. Decision deals with the wrought pipe and fittings division of the original consolidated southwestern cases. Ruled the commission:

All-rail rates on wrought iron and steel pipe and related articles in straight or mixed carloads, from and to the points embraced by the consolidated southwestern cases, found unreasonable to the extent that they exceed or may exceed the column 32.5 rates from and to the same points, minimum weight 40,000 pounds.

Proposed increased rates in I. & S. No. 4381 for application on like traffic over rail-ocean, ocean-rail, rail-ocean-rail and Seatrain routes found not justified. Schedules required to be cancelled and maximum reasonable bases of rates prescribed for application from and to southwestern destinations over these routes.

In connection with the rates prescribed over the water-rail routes, it is further found that Aliquippa, Ambridge, Beaver Falls, Brackenridge, Butler, Economy, Elwaad City, Etna, Morado, New Kensington, and Sharpsburg, Pa., shall be grouped with Pittsburgh, and that Lorain, O., shall be grouped with Cleveland.

All-rail rates on cast iron pipe and related articles, in straight or mixed carloads, minimum weight 40,000 pounds, from and to points embraced by the consolidated southwestern cases, found unreasonable to the extent that they exceed, or may exceed, the reasonable maximum distance scale of rates herein prescribed, with provision author-

izing grouping of origins in the South.

MORE INDUSTRIAL MEMBERS SEEN FOR WAR BOARD

Rumor has it additional industrialists will be appointed to the newly-created war resources board headed by Edward R. Stettinius Jr., board chairman of United States Steel Corp.

It is pointed out transportation is not represented on the board nor are several other industries vitally concerned with national defense. When new members will be named is uncertain.

Offices and a staff at the war department have been assigned to the board with Col. Harry K. Rutherford, ordnance officer, in charge of industrial mobilization plans.

STEEL PRODUCTS INVOLVED IN BELGIAN TRADE PACT

Steel industry has a considerable stake in a new trade agreement now being negotiated between this country and Belgium.

State department states briefs will be received and applications heard until Sept. 27, while public hearings are set for Oct. 9.

List of commodities released by the department includes all products on which concessions have already been made under the existing agreement with Belgium. The fact that concessions previously were granted on these products is to be taken into account and consideration will be given to the information and views on such concessions presented to the department, as well as our experience with them.

Included among commodities on which the United States will consider granting concessions to Belgium:

Muck bars, on which the general duty into the United States is now ¼-cent per pound, while a duty of some 50 per cent prevails under the Belgian trade agreement now in effect.

Steel ingots valued at not over 1¼ cents per pound, duty ¼-cent; billets and bars valued above 1¼ cents and not above 2½ cents, duty ⅜-cent per pound, and "all other," duty 2/5-cent per pound. In these duties a reduction of less than 50 per cent has been made.

Boiler or other plate iron or steel, present duty 0.35c per pound, with reduction of less than 50 per cent in present agreement.

Sheet iron or steel, common or black, between 109/1000 inch and 38/1000 inch thickness, duty 0.35c per pound; between 38/1000 and 22/1000 inch thickness, duty of 0.45c; 22/1000 to 10/1000 inch, 0.60c per pound; less than 10/1000 inch, 0.70c per pound; corrugated or crimped, 0.60c per pound; all the foregoing when valued at more than 3 cents per pound, 20 per cent ad valorem. In all cases present reduction is less than 50 per cent.

Sheets, present duty 20 per cent ad valorem plus 2/10-cent per pound.

Beams, girders, joists, angles, channels, etc., not assembled, 1/5-cent per pound; machined, drilled, etc., 15 per cent ad valorem.

Hoops or band iron, 1/5-cent per pound.

Wire rods, ¼-cent per pound.

Wire strand, 35 per cent ad valorem present duty.

All galvanized wire not specifically provided for, ½-cent per pound.

Railway fishplates, ¼-cent per pound.

Rail braces, 1/10-cent per pound.

Wheels for railway purposes, 1 cent per pound.

Bolts, 1 cent per pound.

Nails, spikes, etc., 4/10-cent per pound.

Rivets, 1 cent per pound.

Woven wire fencing, smaller than 8/100 and not smaller than 3/100 inch in diameter, coated with zinc before weaving, 50 per cent ad valorem; after weaving, 60 per cent ad valorem.

BRITAIN AWARDS CANADIAN FIRM CONTRACT FOR ARMS

British war office has awarded a contract to Marine Industries Ltd., Sorel, Que, for the manufacture of a quantity of arms, according to a report to the department of commerce.

While no figures are given as to the size of the order, it is reported that the first award is considered more or less "educational" and that further contracts for arms will be entered by the British government later.

Extension of the Canadian plant is to begin immediately, according to the report. Arrangements have been perfected whereby technicians from the Schneider-Creusot arms manufacturing plant of France will be loaned to the Canadian company to train personnel. Canadian government did not participate in negotiating the contract.

JAPAN PLANS HER COURSE SHOULD U. S. LAY EMBARGO

Reports have been received here that the Japanese are studying their procedure in regard to American trade in China should United States place an embargo on exports to the Nipponese of scrap iron and steel, munitions and other commodities.

Thought being given this subject by the Japanese is due partly to the numerous bills introduced during the last session of congress suggesting such embargos. If the President takes no action in this direction it is considered certain some pressure will be put on congress. Road was opened to an embargo by the recent abrogation of our 1911 treaty with Japan.

BOLIVIAN MINES MINISTER VISITING IN AMERICA

Reports are current in Washington that D. Foanini, Bolivian minister of mines and petroleum, now visiting in the United States, will discuss the raising of American capital for Bolivia's tin industry. State department officials profess not to know the purposes of the visit while officials of the Bolivian legation have nothing to say.

WAGE EARNERS' COST OF LIVING UP IN JULY

Cost of living of wage earners, after declining for two consecutive months advanced slightly, 0.2 per cent from June to July, according to the National Industrial Conference board. Increase in costs occurred in each of the major groups of expenditures except clothing. Cost of living in July was 1.8 per cent lower than a year ago, and 15.4 per cent lower than in July, 1929.

TIN PLATE SCRAP EXPORTS

State department announces that during July 2605 long tons of tin plate scrap, valued at $48,789, were exported under license. All went to Japan. For the first seven months 7357 tons of this scrap was exported, valued at $136,732, all to Japan.

GOVERNMENT IRON, STEEL AWARDS TOTAL $4,968,687

During the week ended Aug. 19 the government purchased under the Walsh-Healey act steel products valued at $4,968,686.87: Ladish Drop Forge Co., Cudahy, Wis., $15,912; Rust Furnace Co., Pittsburgh, $68,074; U. S. Pipe & Foundry Co., Birmingham, $14,672.54; National Cast Iron Pipe division of James B. Clow & Sons, Birmingham, $16,558.73; Central Iron & Steel Co., Harrisburg, Pa., $488,610; Blaw-Knox Co., Pittsburgh, $11,350; Alan Wood Steel Co., Conshohocken, Pa., $16,880.56; Superior Steel Corp., Carnegie, Pa., $37,054; Hardie-Tynes Mfg. Co., and Koppers Co., Birmingham and Baltimore, $548,400; Bethlehem Steel Co., Alameda, Calif., $25,500; Columbia Steel Co., Seattle, $27,752.60; Moltrup Steel Products Co., Beaver Falls, Pa., $18,619.44; A. N. Eaton Metal Products, Omaha, Nebr., $80,000 (estimated); Martin Steel Products Corp., Mansfield, O., $626,200 (estimated); Columbia Steel Tank Co., Kansas City, Mo., $229,625 (estimated); Butler Mfg. Co., Kansas City, Mo., $2,303,975 (estimated); Sioux Steel Co., Sioux Falls, S. Dak., $133,370 (estimated); and Edwards Mfg. Co., Cincinnati, $163,350.

AVIATION

WARPLANE ORDERS SPUR CANADIAN PLANT EXPANSION

■ CANADA's aircraft industry is undergoing considerable expansion under impetus of large domestic and foreign orders for military ships.

After signing a $10,000,000 contract to build bombing planes for Great Britain, Canadian Associated Aircraft Ltd. recently launched construction of two $500,000 assembly plants at St. Hubert, Que., and Malton, Ont. A heavy volume of additional awards from Britain is anticipated in view of the likelihood her own production would be seriously hampered in event of war. Moreover, the British air ministry is not unaware that its American sources of supply might be cut off by an embargo should war come.

For similar reasons it is believed warplane awards will be forthcoming from France. Canadian planemakers have been negotiating with the French for some time.

Canadian Vickers has announced a contract to build six flying boats costing $900,000 for Canada's defense department. Government also has placed with Fleet Aircraft Ltd., Ft. Erie, Ont., a $250,000 order for 27 military training planes.

Among latest programs involving construction of new factories is that of Herculoude Aircraft of Canada Ltd., proposing to erect a $150,000 plant at Victoria, B. C. General Skycraft Ltd., Montreal, J. Senecal, representative, plans a manufacturing and assembly unit costing $40,000.

With its growing traffic taxing available equipment, Trans-Canada Airways recently ordered from Lockheed Aircraft Corp., Burbank, Calif., five transport craft costing a total of $650,000.

Military and commercial significance is attached to an aviation pact just concluded between the United States and Canada which literally erases the frontier for air traffic by permitting all licensed planes to circulate freely between the two countries.

Factory now going up at Indianapolis for Allison Engineering division of General Motors is said to be American aviation's first completely "controlled conditions" plant. To be ready for operations soon, the 750,000-square foot, $6,000,000 plant will engage in development and production of high-powered liquid-cooled aircraft engines.

Grumman Aircraft Engineering Corp. last week signed a contract with Austin Co. to increase manufacturing space of its Bethpage, L. I., plant by more than 50 per cent. Work will cost $150,000, is scheduled for completion Dec. 15.

Ryan Aeronautical Co. has just moved into its new plant at San Diego. New equipment installed includes: Drop hammers, heat treating furnaces, spotwelders, anodizing, plating and painting equipment, sandblasters and a 5-ton traveling crane.

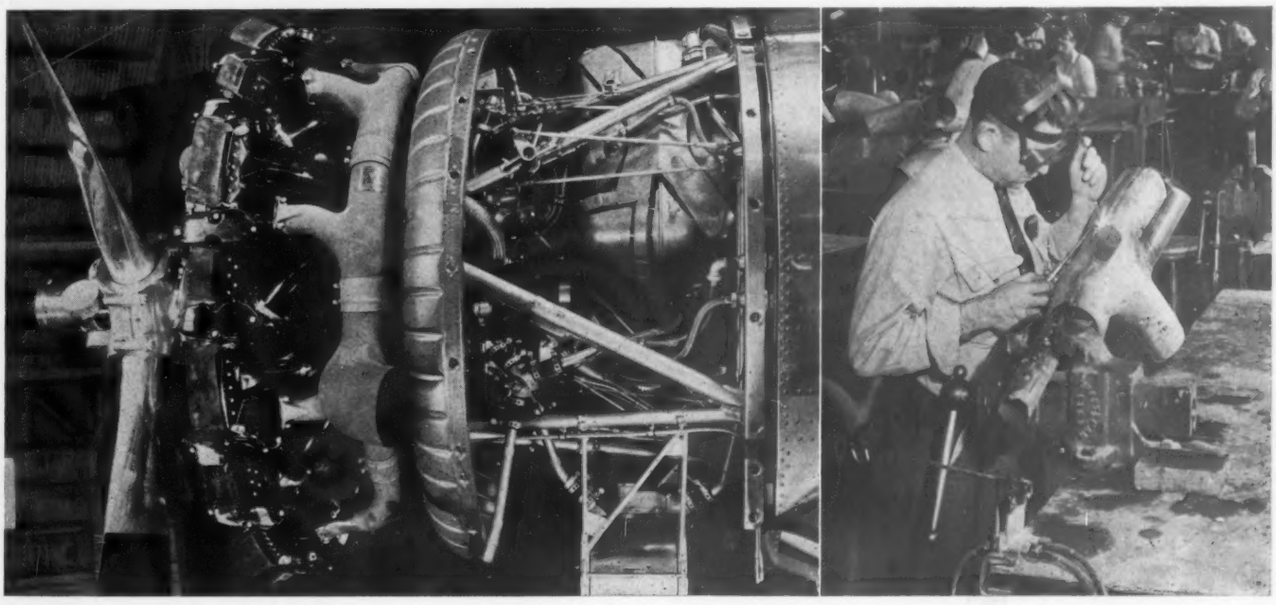
Aeronautical Chamber of Commerce of America last week petitioned the public contracts board to hold "full public hearings" on its proposal to extend to manufacturers of aircraft parts the minimum hourly wage for planemakers prevailing under the Walsh-Healey act. Chamber also requests that briefs be received after the deadline, originally set for Aug. 14. Three parts producers have already submitted briefs protesting their inclusion under the blanket aircraft wage determination. It is expected the board will agree to hold hearings before making its final ruling.

As a result of several recent crashes which it laid to lack of modern full-feathering propellers on planes involved, the air safety board has urged civil aeronautics authority to require that all passenger planes be equipped with this type of propeller. To aid all commercial carriers install the safety propeller, whose complex gearing makes it costly, board suggested their airmail pay be adjusted accordingly.

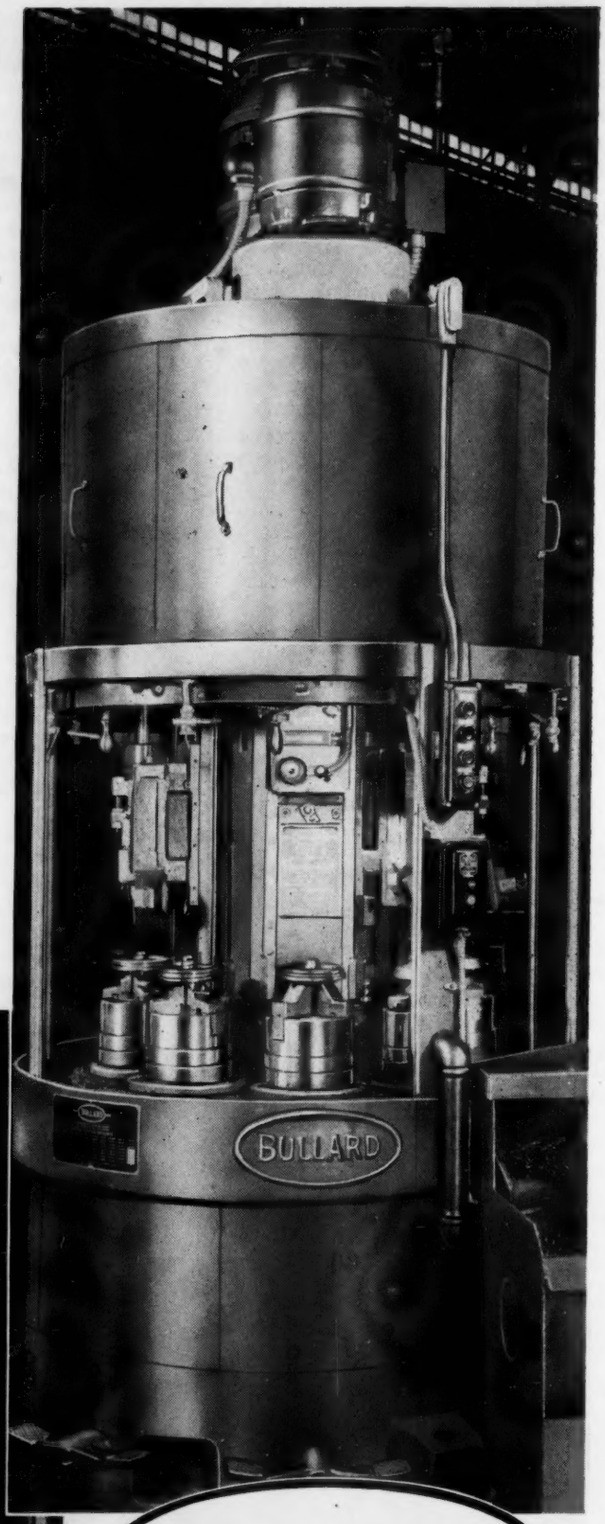
Airplane engines with greater power and compression without an increase in size are seen by Phillips Petroleum Co., Wilmington, Del., in its new aviation fuel, "neohexane". With this fuel a balanced gasoline of 100 octane rating is attained; rating can be raised to 115 by addition of lead. Phillips believes this high-octane gas will boost engine power output as much as 50 per cent. Company now is erecting a plant for commercial production, will have the new fuel on the market early next year.

Manifolds of Stainless

■ **Stainless steel plays an important aeronautical role in engine exhaust manifolds (left). Manifolds are exposed to corrosive and erosive action of exhaust gases, must withstand operating temperatures as high as 1500 degrees, often combined with below-freezing weather conditions. Solar Aircraft Co., San Diego, forms stainless into two halves for each manifold section with drop hammers, then welds the seams (right). Solar's experiments with all-metal planes ten years ago led it to produce the first stainless steel exhaust manifold. Demand proved so great the firm doubled its capacity, has already built 7000 units**



MULT-AU-MATICS *Save Money* on Gear Blanks *2 Ways*

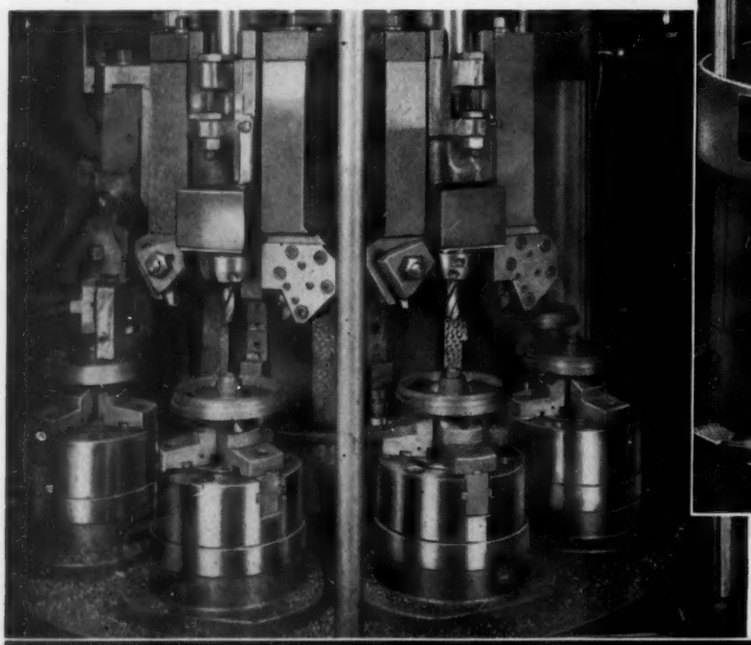


The manufacturer who installed this Bullard "J-7" makes a *double saving.*

He cuts his machining time on small gears to a fraction of his former record because he applies the Mult-Au-Matic Method of individual feeds, individual speeds, and simultaneous operation—result, finished blanks in the time of the longest *individual* operation.

He uses one Mult-Au-Matic for several different size blanks. This is possible and Profitable because of simplified and quick tool change-over for each job. This factor is essential inasmuch as the runs on each job may be short—even as low as 250 pieces.

Give Bullard Engineers the same opportunity to save *you* money that this manufacturer did.

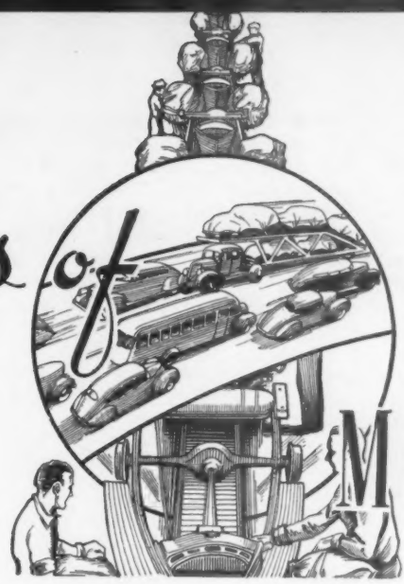


BULLARD

THE BULLARD COMPANY

BRIDGEPORT CONNECTICUT

Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

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DETROIT

■ WHOLESALE program of relocating equipment and reshuffling the complete plant layout in the interests of more efficient manufacturing has been going on quietly at Packard for several months, and the results are a revelation to anyone who has not kept close touch with the changes. The plants are now set up so that practically a straight-line flow of materials through to final assembly line is possible, and nearly all of the former backtracking of parts in process has been eliminated.

The so-called "six" and "120" divisions, on the south side of East Grand boulevard, are now devoted solely to body fabricating and assembly, all machining and final assembly operations having been moved across the boulevard to space formerly devoted only to assembly of larger models. Finished bodies travel on bucks and chain conveyor across the boulevard through a newly constructed overhead bridge and are lowered by hoist on chassis traveling along the final assembly line. Feeding into this final assembly line are numerous other subassembly lines.

Trucking Virtually Eliminated

Miles of overhead chain conveyor have been installed throughout the plant, with the result that trucking virtually has been dispensed with, except for movement of castings and forgings from the foundry and forge shop which are located at the north end of the layout.

Hundreds of machine tools, including milling machines, broaches, drilling machines and the like, some weighing several tons, were torn out of the former 120 division and hauled several blocks to new locations where new foundations had to be laid and other alterations made.

A new paint mixing department has been set up, necessitating installation of a series of some 25 overhead pipelines to carry various colors of paint to body finishing divisions and also to the "touch-up" department. Formerly it was the practice to keep "touch-up" paint in cans, but despite all precautions there were some variations in colors noted between paint piped to spray booths and that kept in cans. Hence it was decided to pipe paint to the "touch-up" department as well.

Changes in the plant naturally have brought appreciable reductions in manufacturing costs, permitting Packard prices to be lowered twice within the past few months. Announced publicly as the culmination of a four-year program, the regroomed plants represent actually more than that, according to Packard spokesmen. Planning is being projected several years further into the future, and while it has not been divulged as yet, it is known that Packard contemplates some new manufacturing programs to absorb much of the space which has been liberated by consolidating of present operations.

Four lines of cars now are assembled on the same lines, and even subassemblies for the four lines can be processed on the same equipment, except for an occasional bypass line. It is estimated 85 per cent of the parts going into these cars are what might be called standard, calling for standard processing operations. The balance is handled on bypass lines. This represents quite a change from former practice when

Assembling Rear Axles at Packard

■ **New rear axle assembly line at the Packard plant in Detroit is just one phase of a complete rearrangement of plant and facilities effected in advance of production of 1940 models. Note particularly good lighting conditions prevailing in this department**

the smaller models were manufactured and assembled in one division, and larger models in another.

New facilities have been installed in the Packard engine test block division. Natural gas is used as a fuel instead of gasoline, supplied from a central distributing station to all the engines being run. Each engine has a special adapter on the carburetor for supplying the gas fuel to cylinders.

Another innovation is the installation of a central pumping and filtering station for supplying lubricating oil to engines on test blocks. Oil is pumped into crankcases through a small hose connection and drains out of the engine at the bottom of the crankcase, the oil being returned to the distributing station where it is filtered and returned to the engines. In this way, any particles of dirt or metal which might get into the oil are certain to be removed before the engine is placed in a car.

■ FIFTEENTH christening of Chrysler "babies" was held Tuesday as several hundred "gentlemen of the pen" lunched and looked at the 1940 lines of the corporation's product. Speaking at luncheon, K. T. Keller, Chrysler president, observed that from the standpoint of production and sales, the model year just closed was highly successful, further that styles developed for 1940 go far beyond anything tried hitherto. Accent is on comfort, apart from style, performance, safety and other standards. "Fashioned for function" was the expression used by Fred M. Zeder, Chrysler engineering chief, in describing the new cars.

Upward of $12,000,000 was invested in tools, dies, jigs and fixtures for 1940 models by Chrysler, new bodies being developed for all four lines. An additional $3,000,000 is being spent currently on expansions in the company's engineering and research facilities.

Commenting on the new high-test safety glass now being used in motor cars, Mr. Keller said that the first use of this material was made on Chrysler cars in February, 1936, and since Jan. 1, 1937, Pittsburgh Plate Glass Co. has shipped to Chrysler 3,661,947 lights of the new glass, aggregating 7,404,844 square feet.

Mechanical and style details of the new models are being withheld for the time being, but a general summary of them was given in STEEL for July 31.

■ FEATURES of the "sealed-beam" headlamps to be used on all new models except Graham and Willys can now be divulged. The lamps were developed after an extensive program of research by automobile companies, lamp suppliers and other interested organizations. They are of two interchangeable types, one an all-glass unit, the other a combination metal-glass unit. The former has the vaporized aluminum reflecting surface on the inside of the 7-inch diameter glass bulb, the double filaments being sealed in the bulb with argon gas. The latter is of conventional design with a silver-plated brass reflector, parabolic in shape, hermetically sealed to the lens and enclosing the small bulb. List price of the units will be $1.35, and average life is claimed to be around 300 hours, compared with 200 for present bulbs. Two bar-shaped filaments will be used, one for the so-called traffic beam and one for the country beam. Both give vastly improved lighting and deteriorate very little with age.

It is not feasible to equip old cars with the new headlamps since they require higher generator capacity, heavier wiring, and accurate voltage control on the generator.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1937	1938	1939
Jan.	399,186	227,130	353,946
Feb.	383,900	202,589	312,141
March	519,022	238,598	389,489
April	553,231	238,133	354,263
May	540,377	210,183	313,214
June	521,153	189.399	324,235
July	456,909	150,444	*198,000
7 mos.	3,373,778	1,456,501	2,245,288
Aug.	405,072	96,936	.....
Sept.	175,630	89,623	.....
Oct.	337,979	215,296	.....
Nov.	376,629	390,350	.....
Dec.	347,349	407,016	.....
Year	5,016,437	2,655,777	.....

*Estimated.

Estimated by *Ward's Reports*

Week ended:	1939	1938†
July 29	40,595	30,390
Aug. 5	28,250	14,771
Aug 12	24,875	13,790
Aug. 19	12,955	23,940
Aug. 26	18,365	18,700

†Comparable week.

	Week Ended Aug. 26	Aug. 19
General Motors	2,600	1,215
Chrysler	6,800	2,450
Ford	450	2,025
All others	8,515	7,305

■ FIRST week of Buick production on 1940 models has been completed, around 1500 cars coming off assembly lines as output is gradually accelerated to a daily peak of 1200. Some 5000 employes returned to their jobs at Flint, and the working force is being built up to capacity of 11,000. According to H. H. Curtice, president and general manager, the Buick program for 1940 calls for a substantial increase over the 1939 model season. Current production is being scheduled so that a peak will be reached about mid-September and maintained through the last quarter of the year.

At Buick's preview Mr. Curtice said the company contemplates building 240,000 cars for the 1940 model year, 20 per cent more than in 1939. About $40,000,000 already has been expended in commitments for production materials, supplies and wages for the next 60 days. This does not include an $8,000,000 outlay for plant changes and new machinery. On the basis of manufacturing plans for the ensuing model year it is estimated expenditures for the entire year will total some $200,000,000, or approximately $800 per car.

A considerable amount of retooling work was carried out by Buick during the changeover period, about 3500 men being busy on this phase of operations. It is estimated that in the retooling program more than 15,000 separate items of tools and equipment were required.

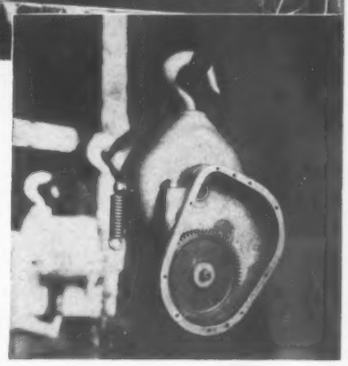
Two new series have been added to the Buick line—a 50 and a 70—called the "Super" and "Roadmaster" series respectively. Representing an entirely new type of body construction, the cars are wider and stronger, are double-bolted to a wider frame. In all, Buick will offer six lines of cars on four wheelbases.

W. F. Hufstader, firm's sales manager, reports dealers already have on their books orders for 15,000 new models despite the fact that they will not become available for three to four weeks.

■ RESULTS of the votes on labor unions at Packard and Motor Products Corp., showing the UAW-CIO group to be favored in each case, by majorities of 4 to 1 and 10 to 1 respectively, are considered to forecast what will happen in similar elections to be held at Briggs and Chrysler plants, the former vote being set for Sept. 14. It was generally believed the CIO unions would win out at Packard and Motor Products, although the lopsided margin of victory was somewhat surprising. What amazed some observers even more, however, was the small vote favoring neither the CIO nor the AFL, only 637 out of 8300 votes at Packard and 80 out of 3150 at Motor Products being in this category.

Next move will be for the UAW-CIO to request negotiations for a new contract with Packard. It is believed this will be effected amicably, the union indicating the only demands it would raise would be for changes in some seniority details, no wage increases being proposed.

NEEDLE BEARING MEETS ALL REQUIREMENTS IN THE "*BUDGIT" HOIST



(*Above*) The Needle Bearing is quickly installed on a production basis, using a tool developed by Shaw-Box engineers to speed up assembly line.

(*Left*) Here is the popular "Budgit" Hoist in operation on the job, with the Torrington Needle Bearing at work under heavy loads.

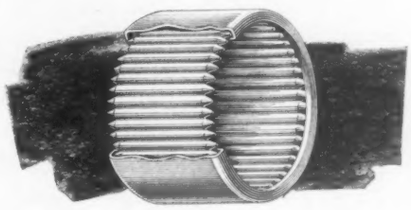
(*Right*) Two of the Needle Bearings are seen in place on a partly assembled hoist on the production line.

"HERE are the engineering problems we solved with the Torrington Needle Bearing," say the makers of the well-known "Budgit" Hoists:

"High load carrying capacity and small size for mounting in a limited space.
"Installation with the minimum of 'fussing'.
"Positive lubrication without special provision, and lubrication for long periods without attention.
"Reasonable cost."

Check this list of bearing requirements prepared by the engineers of Shaw-Box Crane & Hoist, and see how it compares with bearing problems on your own product. And check them with the design features of the Needle Bearing: a full complement of small-diameter rollers to give ample radial capacity; small size in proportion to rating; compact unit design for easy installation; thorough, efficient lubrication provided by a large reservoir for lubricant; cost of bearing and installation surprisingly low. Because of these features, the designers of the "Budgit" Hoist found that *only* the Torrington Needle Bearing met all their bearing requirements.

Our Engineering Department will be glad to show you how easily you can



meet similar engineering problems by incorporating the Needle Bearing in your own designs. Because of its small diameter and compact design, the Needle Bearing is readily adaptable to even the simplest type of housing. In fact, its use often makes possible the simplification of present housing designs, with consequent savings in weight, space, and cost.

For further information on the Torrington Needle Bearing, write for Catalog No. 10. For Needle Bearings to be used in heavier service, request Booklet No. 103X from our associate, Bantam Bearings Corporation, South Bend, Ind.

** Trade Mark Reg. U. S. Pat. Off.*

The Torrington Company
ESTABLISHED 1866
Torrington, Conn., U.S.A.
Makers of Ball and Needle Bearings
Branch Offices in all Principal Cities

TORRINGTON
NEEDLE BEARING

Editorial

TNEC Will Hear Steel's Story

■ LAST March the federal trade commission, when testifying before the temporary national economic committee, hailed the steel industry as "a focal center of monopolistic infection which, if not eradicated, may well cause the death of free capitalistic industry in the United States."

"The wastes of cross-hauling and of excess capacity and high capital overhead are saddled on the consumer as if they were legitimate costs," declared the commission. "Under the guise of freight costs, buyers located at a distance from a basing point, even though they purchase from a mill in their own city, are charged what amounts to a penalty." The commission charged the steel industry with being "shortsighted" in carrying out the system "which is destroying the purchasing power of the people." It contended this factor was "one of the things which helped to bring on the depression."

Steelmakers Have Much Evidence To Disprove Charges of Monopoly

Since that time steelmakers have been supplying a vast amount of information to agencies co-operating with the economic committee in its investigation as to whether practices in the industry are of a monopolistic character. At the same time they have accummulated a vast amount of additional information which has to do with the relation of the industry to our national economy. When called on to testify, therefore, they should have little difficulty in controverting the federal trade commission's charges.

Unfortunately, the committee's plans with reference to a hearing for the steel industry are not yet definite. The committee has indicated that representatives of the steel industry will be invited to testify during the last half of October and that the witnesses will include a dozen or so leaders in the industry together with a representative group of steel consumers. With only seven weeks intervening, no invitations yet have been received by individuals in the industry and the technique to be followed is undisclosed. For instance, it is not known whether the witnesses will be free to tell their stories in their own way or whether they will be restricted to answering questions.

Strong Presentation by Steel Should Aid General Industrial Situation

The latter is an important point, for the indications are that if witnesses are restricted largely to replying to questions the story will be concerned largely with the steel pricing system and its alleged social and economic effects. Under this head come such matters as alleged price collusion and the various aspects of the pricing system as presented by the federal trade commission. Such a story could add nothing to the committee's finding as to how the country's economic condition may be improved.

The real story of the steel industry and its relation to our economic system is the same as the story for industry in general. It is the story of depressed business sentiment caused by new laws and administration polices. If the steel industry on this occasion is able to tell this story effectively, the resulting publicity should be highly beneficial to the cause of business in general. Now that public sentiment toward business is veering to the right, a strong story by the steel industry might prove a powerful factor in dictating the character of next year's legislation and in influencing the policies of the national administration to be chosen by the voters at next year's election.

The BUSINESS TREND

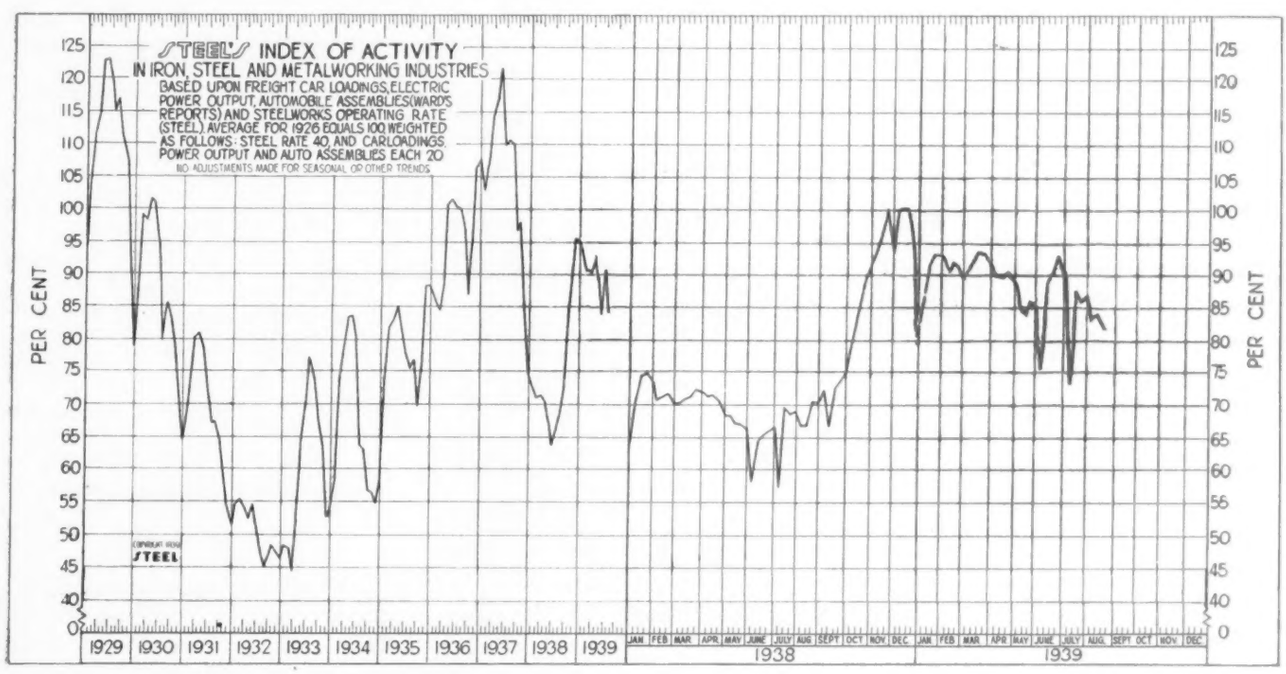
Industry Active Despite Lull in Auto Output

■ Notwithstanding impressive gains in railroad freight traffic, steelworks operations and electric power output, STEEL'S index of activity in the iron, steel and metalworking industries receded slightly in the week ended Aug. 19.

The index stands at 82.3, compared with 83.9 in the week ending Aug. 12. The loss of 1.6 points was caused entirely by a sharp reduction in automobile assemblies, which more than offset the gains in the other three barometers on which the index is based.

In the first half of August, automobile production had been maintained at around 25,000 cars weekly due largely to the fact that Ford Motor Co. continued to turn out 1939 models. During the week ending Aug. 19, Ford joined the other large builders in the process of changing over to 1940 production. The result was a drop from 17,000 to 2025 assemblies per week for Ford and a recession from 24,875 to 12,955 cars in the total output of the industry.

Last year the low point of production in the change-over period was touched in the week ended Aug. 13. This year the low point to date was in the week ended Aug. 19. Thus the shift to new models would seem to be


STEEL'S INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100. WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20.
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS.
PER CENT
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
1938
1939

STEEL'S index of activity declined 1.6 points to 82.3 in the week ended Aug. 19:

Week ending	1939	1938
June 10	88.2	64.4
June 17	90.9	65.2
June 24	93.0	66.0
July 1	91.0	66.5
July 8	73.4	57.1
July 15	87.8	69.9
July 22	86.0	68.7
July 29	86.8	69.0
Aug. 5	83.5	66.9
Aug. 12	83.8	66.9
Aug. 12	83.9	66.9
Aug. 19	82.3	70.5

Mo. Data	1939	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Jan.	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1	87.6	104.1
Feb.	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5	99.2	111.2
March	92.6	71.2	114.4	88.7	83.1	78.9	44.5	54.2	80.4	98.6	114.0
April	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0	101.7	122.5
May	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6	101.2	122.9
June	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1	95.8	120.3
July	83.7	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3	79.9	115.2
Aug.	....	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4	85.4	116.9
Sept.	....	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3	83.7	110.8
Oct.	....	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2	78.8	107.1
Nov.	....	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4	71.0	92.2
Dec.	....	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3	64.3	78.3

at least a week later this year than was the case in 1938.

General Motors and Chrysler stepped up production only negligibly in the week ending Aug. 19, but the output of companies other than General Motors, Chrysler and Ford climbed from 4705 to 7305.

Electric power output in the week ended Aug. 19 amounted to 2,367,646,000 kilowatt hours. This establishes a new all-time record and exceeds the previous peak of 2,362,947,000 in the week ending Dec. 24, 1938, by a comfortable margin.

The new record is remarkable in that it was made in August. One expects power records to occur in the winter months and particularly in December, which is the month in which power loads normally are heaviest.

Steelworks operations in the week ending Aug. 19 were at 63.5 per cent of capacity. This is a new high for the current calendar year. A year ago the rate was 41.5 per cent and two years ago it was 81 per cent.

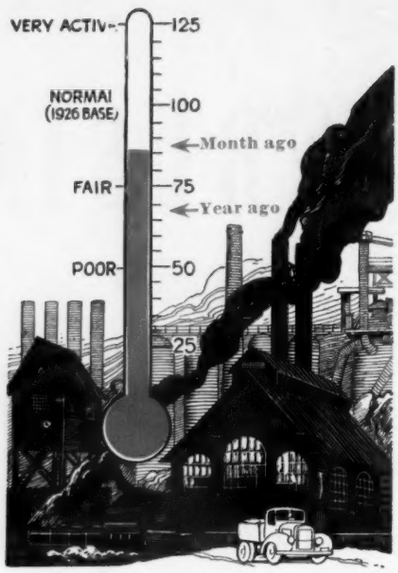
Revenue freight car loadings were expected to touch 675,000 cars in the week ending Aug. 19. If this preliminary figure is confirmed by the final report, it will constitute a new high for 1939. The highest car loading week to date this year was that ended July 15, when 673,812 were reported. Loadings in the week ended Aug. 20 last year totaled 597,918.

Where Business Stands

Monthly Averages, 1938 = 100

	July, 1939	June, 1939	July, 1938
Steel Ingot Output	**181.8**	**133.2**	**87.6**
Pig Iron Output	**146.8**	**136.5**	**75.6**
Freight Movement	**113.7**	**108.2**	**99.0**
Building Construction	**112.5**	**108.2**	**89.9**
Wholesale Prices	....	**97.1**	**100.0**
Automobile Production	**89.4**	**146.5**	**67.9**

Industrial Weather



TREND: *Steady*

From the foregoing it is apparent that industry is enjoying a fairly brisk rate of activity, except for the expected and normal technical lull in motor car production. As more builders get under way on 1940 schedules, increasing automobile assemblies should round out industrial activity to a more satisfactory condition than has existed since 1937.

That is not to say that activity is well balanced. It still is too spotty. Shipbuilding and production of aircraft are being pushed to the limit. Some lines of heavy machinery and equipment for industry are dull. Non-resident building construction is far from satisfactory.

On the whole, however, the domestic situation has improved appreciably. Only the threat of war abroad clouds an otherwise clearing sky.

The Barometer of Business

Industrial Indicators

	July, 1939	June, 1939	July, 1938
Pig iron output (daily average, tons)	76,001	70,647	39,131
Machine tool index	230.9	211.6	89.6
3-months moving ave.	220.8	195.7	75.5
Foundry equipment new order index	111.9	134.6	74.2
Finished steel shipments.	676,309	733,433	441,570
Ingot output (daily average, tons)	164,447	120,399	79,282
Dodge bldg. awards in 37 states (valuation)	$299,883,000	$288,316,000	$239,799,000
Automobile output	*198,000	324,235	150,444
Coal output, tons	29,490,000	28,506,000	23,357,000
Business failures, number	917	952	995
Business failures liabilities	$14,150,000	$11,609,000	$10,793,000
Nat'l. Ind. Conf. board (25 industries) Av. weekly hr. per worker in factory†	37.2	36.5	33.1
Factory av. weekly earnings	$26.79	$26.19	$23.74
Cement production, bbls.	.....	11,126,000	10,967,000
Cotton consumption bales	.....	578,448	449,511
Car loadings (weekly av.)	652,910	620,797	568,225

* Estimate.
† June, May and June, respectively.

Foreign Trade

	June, 1939	May, 1939	June, 1938
Exports	.....	$249,259,000	$232,686,000
Imports	.....	$202,502,000	$145,898,000
Gold exports	.....	$36,000	$131,000
Gold imports	.....	$429,440,000	$55,438,000

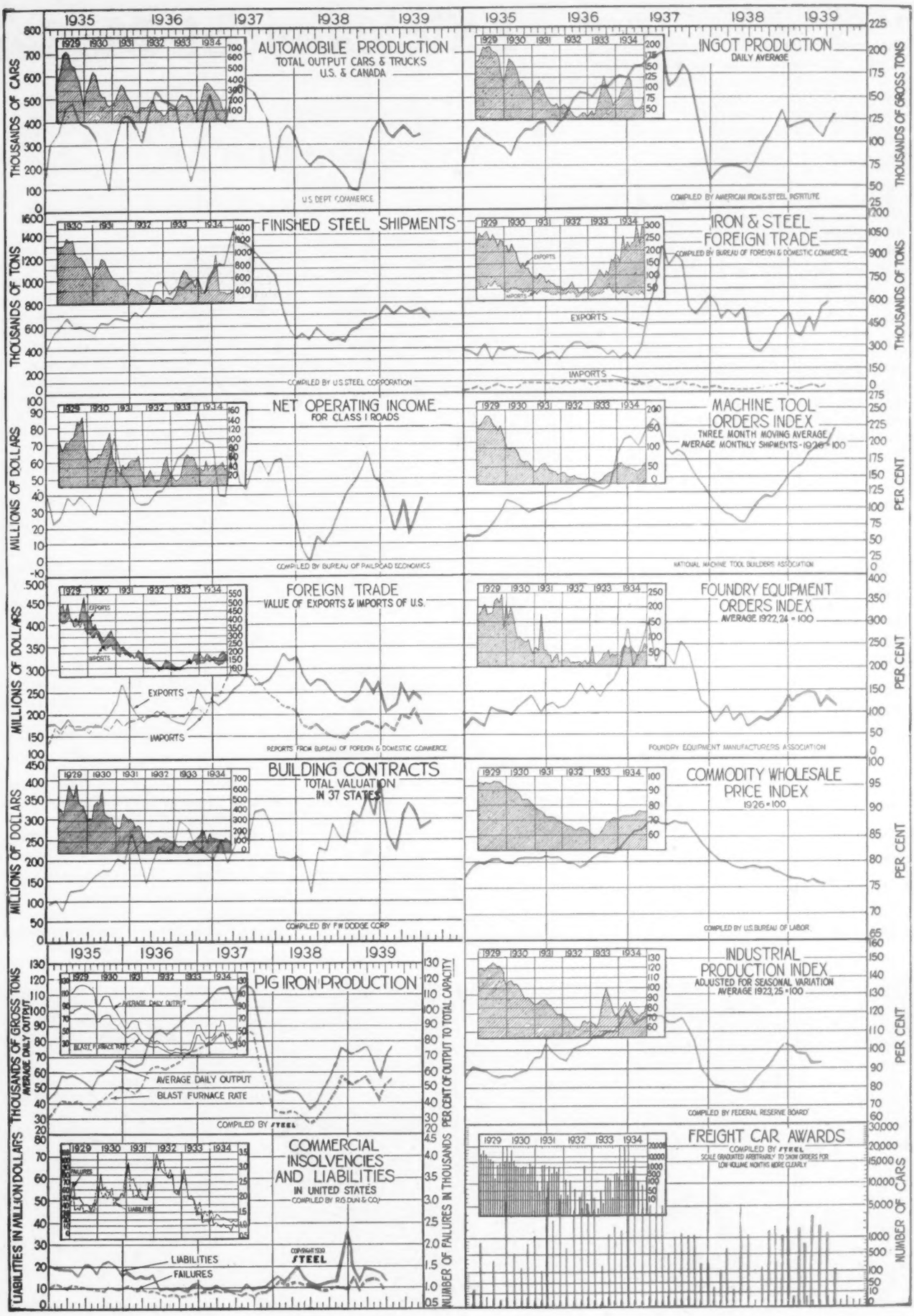
Financial Indicators

	July, 1939	June, 1939	July, 1938
25 Industrial stocks	$178.03	$173.12	$176.59
25 Rail stocks	$21.45	$20.79	$21.79
40 Bonds	$71.82	$71.72	$70.57
Bank clear'gs (000 omitted)†	.....	$22,188,000	$21,624,000
Commercial paper rate (N. Y., per cent)	½-⅝	½-⅝	¾
*Com'l. loans (000 omitted)	$8,166,000	$8,089,000	$8,161,000
Federal Reserve ratio (per cent)	86.3	85.6	82.4
Capital floatations (000 omitted)			
New capital	$317,525,000	$292,576,000	$390,633,000
Refunding	$268,207,000	$311,804,000	$79,064,000
Federal Gross debt. (mil. of dol.)	40,661	40,440	37,194
Railroad earnings†	.....	$25,100,765	.....
Stock sales, New York stock exchange	18,065,610	11,967,710	38,761,675
Bond sales, par value	.....	$126,656,525	$178,157,075

* Leading member banks Federal Reserve System.
† June, May and June respectively.

Commodity Prices

	July, 1939	June, 1939	July, 1938
STEEL'S composite average of 25 iron and steel prices	$35.82	$35.69	$36.32
U. S. Bureau of Labor's index	.....	76.3	78.8
Wheat, cash (bushel)	$0.83	$0.90	$0.85
Corn, cash (bushel)	$0.56	$0.65	$0.72


1935 1936 1937 1938 1939
AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
THOUSANDS OF CARS
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
THOUSANDS OF GROSS TONS
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
THOUSANDS OF TONS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
MILLIONS OF DOLLARS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
PER CENT
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922-24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACTS
TOTAL VALUATION IN 37 STATES
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
PER CENT OF OUTPUT TO TOTAL CAPACITY
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923-25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

Efficiency of Modern

■ WHEN PAYING tribute to success in agriculture, it long has been customary to say: "He made two blades of grass grow where one grew before." Of success in industrial production, I feel that it is equally fitting to say: "He made several tools cut where one cut before."

At a time when there have become available to machine tool builders and machine tool users cutting materials capable of speeds and feeds unprecedented only a short time ago, there may be some tendency to overlook the fact that there are other important ways of boosting machine tool performance than by increasing speeds and feeds. One of the most important of these ways is by the multiple cuts performed simultaneously. This technique applies not only to the application of tools but also to the application of grinding wheels. It will be one of the things well worth watching for at the National machine tool show in October. I know of no single phase of machine tool engineering wherein more ingenuity has been shown of late, than in this matter of multiple tooling for simultaneous cuts.

Since the advent of the multiple spindle automatic about 45 years ago, it has been the basic axiom of that type of machine tool that "the approximate time per piece is the time of the longest single operation." Realizing the truth of that axiom, multiple spindle automatic specialists always have sought to "split operations." For instance, if the longest single operation was the drilling of a deep hole, this would be divided up between two, three or more stations—thereby cutting down the time tremendously. The same has been true of cutting-off operations, which because of the narrow blade required are likely to be long operations if attempted in a single position.

Interesting and significant though these multiple spindle operations are, it is not with them that this article is concerned. It is with single spindle machines that I have chosen to deal, for the reason that the possibilities of simultaneous multiple cuts are much more apt to be overlooked on these machines than they are on the "multiples."

Take turret lathes for example. The fact that they usually have six turret positions, four cross slide positions plus in many cases a cut-off working from the rear, all too frequently is a temptation to utilize all these positions. At least it is a temptation to those not thoroughly initiated into the mysteries of getting the most out of these extremely useful and versatile machines.

Overhead Piloting

Since the first commercial turret lathes were introduced more than 80 years ago, many improvements have been made in this type of machine tool. Comparatively simple in principle though it is, one of the most important of these improvements has been the multiple turning head for mounting on the turret and providing for overhead piloting when this extra support is required. At least this is one of the most important of all turret lathe tooling developments.

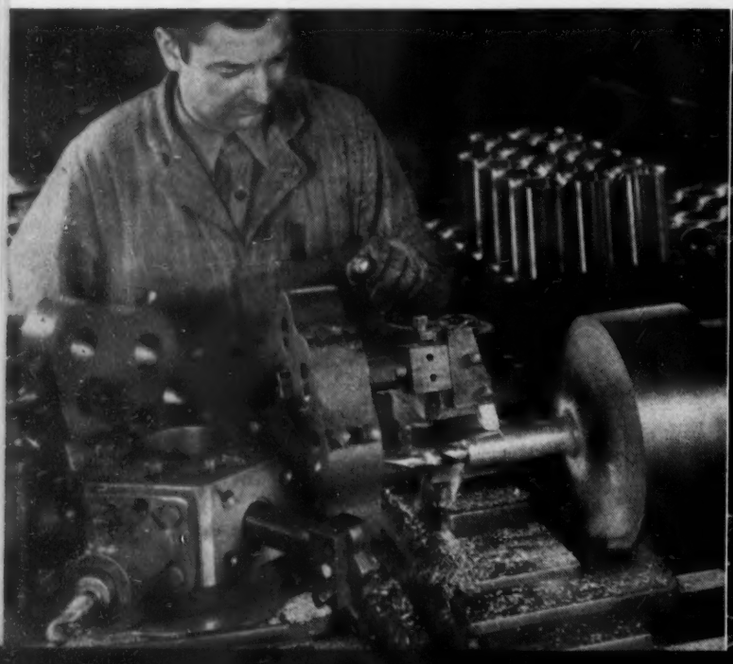
It is not always easy to bring out graphically by means of photographs, the advantages of multiple tooling. Either the set-up will be so complicated as to confuse the observer of the photograph, or essential parts of it will be hidden from view. Therefore, to illustrate this article I have chosen some of the simpler cases wherein the advantages cannot fail to be obvious. I might add that in tooling—just as in machine design—simplicity is apt to be a mark of good work. By that I mean that there is no engineering merit in complication if there be a simpler way to achieve the same end.

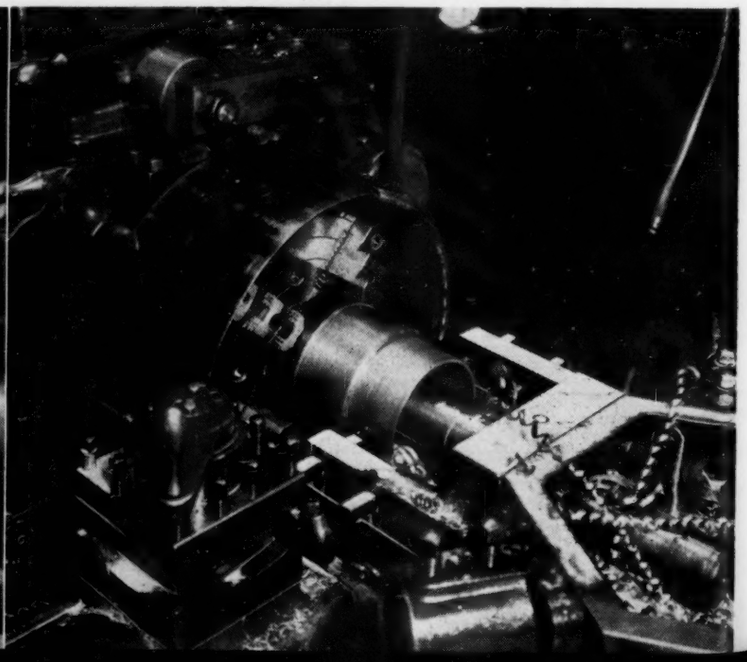
The operation shown in Fig. 1 is interesting for two reasons. In the first place, exceedingly high speed is here being used on this bronze bushing for an excavator. This high speed, which is made possible through the use of cemented carbide tools, is indicated by the motion of the chuck which occurred during the instantaneous exposure of the negative.

On this part it will be noted that while drilling of the bushing is going on, turning of its outside is taking place also. This is made pos-

Fig. 1. (Left)—Example of multiple cutting in a Gisholt ram type universal turret lathe which is set up for simultaneous drilling and turning of bronze bushings

Fig. 2. (Right)—Through use of this box tool which permits two roughing and two finishing cuts while boring tool is operating, time on these steel packer nuts was cut 75 per cent





Machine Tools Increased by Multiple Cutting

By GUY HUBBARD
Machine Tool Editor

sible by the use of the multiple turning head bolted to the face of the turret. This permits the easy mounting of the drill and of the turning tool in the same position and would show the use of an overhead pilot if the service demanded it. Although the limits on this part are close—minus 0.0013-inch plus 0.0000—a saving in time of more than 50 per cent was made possible by this system of tooling.

Fig. 2 shows a still greater concentration of cuts at one turret position. The part in this instance is a packer nut used in the oil industry and is made of heavy 6-inch steel pipe. The box tool used in this setup performs two roughing cuts at the front side, and two finishing cuts at the back side—simultaneously with the boring of the piece and all at one pass of the turret. Simple though this appears, it was to a large degree instrumental in cutting down the floor to floor time on these packer nuts from 55 to 13 minutes.

An even simpler application of multiple cuts is that depicted by Fig. 3. In this instance, advantage is taken of the ability of the turret to "feed itself," thereby accomplishing the drilling of the steam trap head while the operator concentrates his attention on the facing operation from the cross slide. Largely because these simultaneous operations were possible in a turret lathe the time on this part was cut from 5 to 2½ minutes, which means a lot when yearly production is 20,000 parts.

This matter of "automaticity" of machine tools is one which has been greatly misunderstood in certain quarters. Take for example the operation shown in Fig. 4. Here we see an automotive bevel gear being machined in an automatic machine equipped with multiple tools. The fact that this machine is automatic means primarily that instead of the operator having to act as a "power source" for feeding in these tools, he is able to concentrate his attention on the "supervision" of the machine—an activity which makes use of his brain and not simply of his brawn.

This is true of most automatic machines. They relieve the man of tedious and back-breaking work which no man ought to have to do anyway if a machine can be made to do it. They give his mind a chance to do the things that only the mind can do. At the same time, they so cut the cost of the parts that the market is correspondingly broadened and the number of jobs involved actually is greater than would have been the case had these modern machine tools not been applied.

Fig. 3. (Left)—While the ram type turret is feeding in the drill, the operator concentrates on facing this steam trap head, held in quick-acting air chuck

Fig. 4. (Right)—Multiple tooling is demonstrated effectively on this Simplimatic machine which is set up on an automotive bevel gear

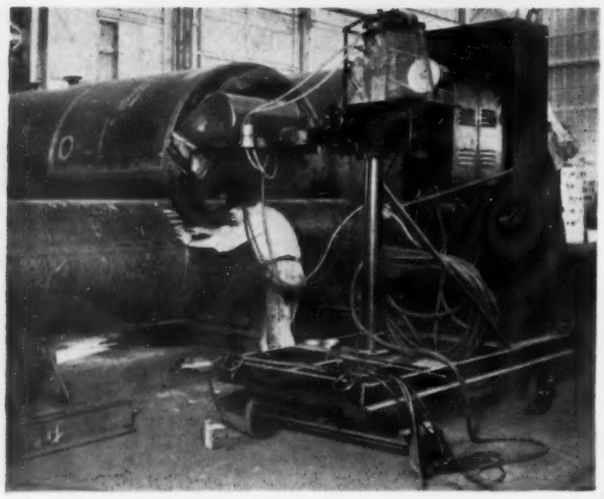


Fig. 1—Portable X-ray equipment for industrial use

X-Ray AS A

Two new aids make radiography a dependable production tool. Penetrameters guarantee proper volt-ampere-time relationship. Use of fluorescent intensifying screens reduces exposure to one-sixteenth former period

■ RADIOGRAPHY appears the outstanding method of nondestructive testing of welded structures today. Great penetrative power of modern equipment shows up differences in density of welds caused by porosities, slag inclusions or incomplete penetration. Two methods of radiography are widely employed, the X-ray and the gamma ray. Pictures made by the first process are known as exographs. Those made by the second process are known as gammagraphs.

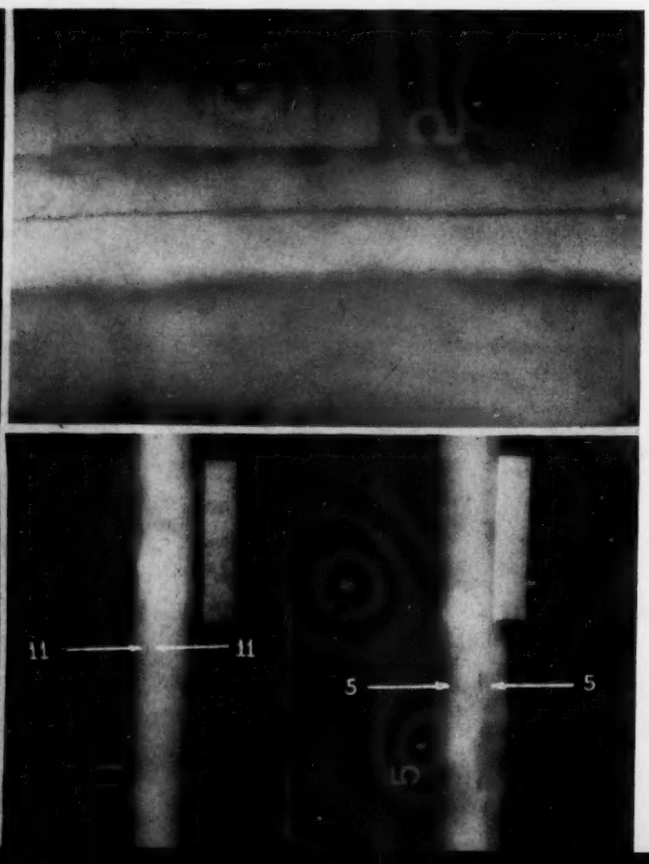
In general the X-ray is used for pressure vessel weld inspection and for testing work, its practical limitation appearing to be in the neighborhood of 5¼ inches of steel, where the penetrating power of X-rays generated in a 400,000-volt machine together with present means of identifying the waves after they strike the film appear to be on the point of incipient loss of detail.

Development of portable X-ray

Abstract from *The Welding Journal*, published by American Welding Society, New York.

Fig. 2—(Upper left)—Piece of film being placed on inside of a cassette. Fig. 3. (Lower left) — Macrograph showing weld not chipped before welding on reverse side

Fig. 4. (Upper right)—Welded seam in a pressure vessel. Fig. 5. (Lower right) —Radiagraphs of seams with slag inclusions



By ORVILLE T. BARNETT
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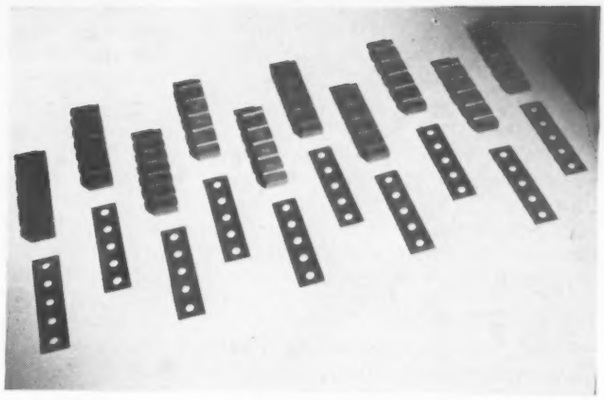


Fig. 8—Two types of penetrameters for checking X-ray technique

A PRODUCTION TOOL

equipment for industrial use has come a long way. At the plant of Black, Sivalls & Bryson Inc., Oklahoma City, Okla., the X-ray is an important production tool. Accompanying illustrations show such equipment in use at this plant and typical results obtained.

In Fig. 1 the portable 400,000-volt X-ray machine is shown in use. One man is in the control cabinet and another is alongside. Men are protected by the lead lining of the cabinet door as well as the cabinet.

In addition, the entire operating head is surrounded by lead to decrease the possibility of harmful X-radiation being scattered into the welding shop. Control panel carries instruments for indicating and adjusting the voltage according to the shell thickness. The rheostat permits varying the amperage in the tube, current usually being kept in the neighborhood of 10 milliamperes. A timing switch and necessary series starting and stopping switches complete the control devices.

Operating head contains the X-ray tube, two rectifying tubes, condensers and a transformer, all submerged in a bath of oil which in turn is surrounded by cooling coils. A radiator and water pump are connected to the cooling coils to keep the temperature down.

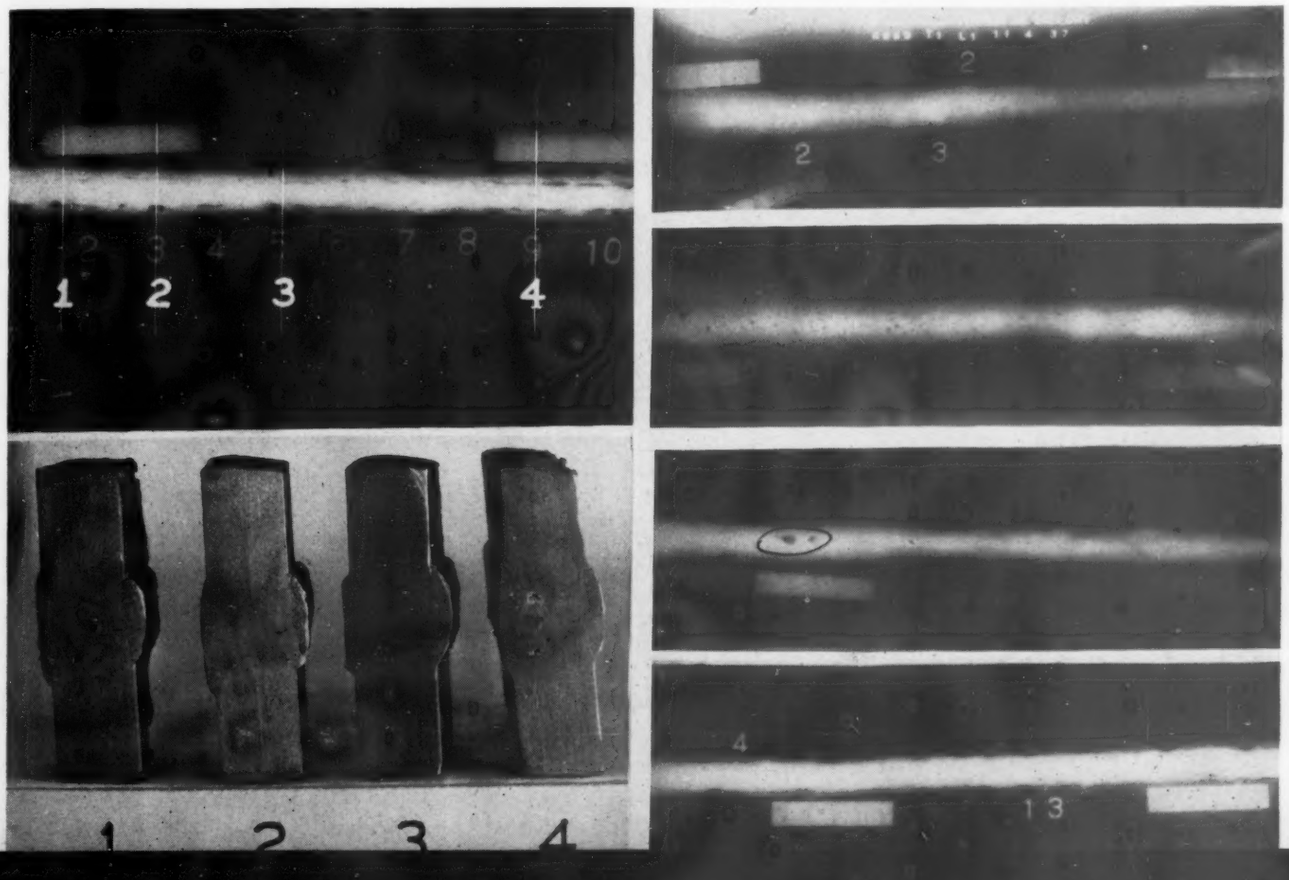
The vessel to be examined carries identifying numbers fastened by adhesive tape across the welded seams. Numbers are made of lead so they show on the finished exograph.

Penetrameters Used

To furnish a check upon X-ray exposure and proper voltage-ampere-time relationship, penetrameters are placed at each end of the section to be radiographed. These penetrameters, Fig. 8, are of two distinct types, depending upon whether the seam preparation practice dictates removal of the overlay

Fig. 6. (Upper left)—This shows slag included at side of weld. Fig. 7. (Lower left) — Macrographs corresponding to points in exographs of Fig. 6

Fig. 9. (Upper right)—Exograph of good weld, top, and poor weld, bottom. Fig. 10. (Lower right)—Here are shown slag inclusions and undercut



bead, or whether this overlay bead is left in place.

Where the overlay bead is removed, thin penetrameters such as those shown in foreground of Fig. 8 are used. Thickness of these is 2 per cent of the thickness of the welded seam. This type of penetrameter has holes at regular intervals which must show on the finished exograph if proper technique has been employed.

For Overlay Bead

Where the overlay bead is left in place, a second type of penetrameter is used, represented by those in the background of Fig. 8. These have a thickness equal to the sum of the reinforcement inside and outside. With the usual overlay bead of approximately 3/32-inch high, the height of the penetrameter is twice 3/32-inch or 3/16-inch in that instance. This type of penetrameter has milled slots whose depth is 2 per cent that of the welded seam. These slots must show clearly in the finished exograph if proper voltage-ampere-time relationship has been employed. Thus these penetrameters furnish a check on the radiographic procedure, assuring that defects in weld are not overlooked because of a fogged or improperly exposed negative.

The film for exographs is placed in a cassette or holder, shown in Fig. 2. This holder then is held in place on the inside of the seam to be tested and in the path of the X-rays. In examining welds in shells which have a short curvature, a shorter film is required than in examining vessels of large diameter because of a falling-off effect which results from the X-rays' being called upon to traverse increased thickness of metal at each extreme end of the exposure. This effect is illustrated in Fig. 11 where the increased thickness is represented by the difference in metal thickness at points A and B. Of course, in placing the cassette it is located carefully on the inside of the vessel to correspond with the outside layout region. A lead sheathe is placed in back of the cassette to prevent secondary radiation from re-entering the film from the back to obscure the desired details. A spring-mounted support is used to hold the cassette in place during the time of exposure. Thus the workmen are not exposed at this point.

Economics of X-ray inspection are relatively simple. Radiographic examination permits use of higher efficiency seams than without radiographic inspection. Thus because of the allowable joint efficiency that is given for radiographed seams where the vessel wall thickness is large and corrosion is not a factor, it becomes more economical to use a higher joint efficiency with radiographic inspection than to use a lower joint efficiency with resultant thicker plates and no radiographic inspection. In this manner, the X-ray process is able to pay for itself in numerous applications. No doubt it will be employed more and more as a production tool as users become more familiar with new developments in equipment and procedure.

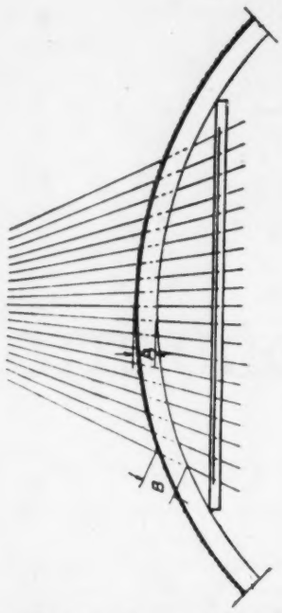


Fig. 11.—Drawing representing passage of X-rays through vessel wall and onto film showing how added metal through which rays pass at edge of film cause a falling-off effect

Gaining in Popularity

X-ray equipment appears to have emerged from the role of a control instrument to that of a production tool. In fact, no boiler or pressure vessel may be welded unless its shell seams are subjected to radiographic investigation. The gaining popularity of radiographed pressure vessels no doubt has been partly responsible for the rapid development of portable industrial X-ray equipment.

However, the X-ray still maintains a prominent position as a control instrument. Defects in welds may be picked out and judged with re-

Nickel Used in Television Tubes

■ **Various stages in the making of the pure nickel elements of the cathode-ray tube, heart of the television receiving set, comprising cylinders, deflecting plates and a cathode. With the exception of the deflection plates, this assembly is known as the electron gun since it shoots electrons at a fluorescent screen to form the image. Nickel is used for these elements because it can be degassified readily at moderate temperatures, remains strong at high temperatures and lends itself to a wide variety of fabrication operations including spot welding. Photo courtesy International Nickel Co. Inc., New York**

markable accuracy after some little experience is gained. Too, it is fairly simple to correlate the findings of the X-ray with improper shop practice so that proper procedure may be determined and followed.

As a control tool, the X-ray machine stands as a constant guard over each welder. From time to time it can be used to check the quality of his deposit. Thus used as a random investigator, it tends to keep the welding operators keyed to a high point of welding efficiency. Strangely enough, the rules and regulations that have to be established for the proper manipulation of the arc to give perfect welding under X-ray examination are really quite simple. Because of this it costs no more to make an X-ray perfect weld than it does to make one of lesser quality. There is a natural tendency, therefore, to train each and every operator to a high point of X-ray efficiency which in turn maintains excellent quality standards throughout the entire welding shop.

In making exographs of test plates, a special table is employed which carries a grooved slot for the cassette. On top of this is placed the welded test plate. Lead numbers are used to represent the date, the serial number of the picture, and penetrameters are employed to check X-ray procedure. Lead is used rather freely over ends of seams to prevent fogging of the edges of the film where radiation is not impeded by the steel test plate. In doing this work, the source of X-rays is placed directly above the test plate. With the plate laid horizontally on the table, no clamps or fixtures are necessary to hold it in position nor does the operator need to stand close.

Flourescent Screens

Among the comparatively recent improvements in X-ray practice is the use of fluorescent screens. These screens are placed adjacent to the film and on the side towards the weld being examined. They usually form a portion of the cassette which holds the film. These screens are made of calcium tungstate which changes the X-radiation to fluorescent light. As this light registers quickly on the film, it records a picture just as daylight would and greatly intensifies the picture which the negative is trying to register. Thus the intensifying screens reduce exposure period necessary to make an impression on the film as much as 16 times. This development not only facilitates actual radiographic procedure, but greatly extends amount of weld that can be examined in any given period of time. This development also is largely responsible for making X-ray examination an economically sound proposition today.

An examination of typical exographs will show commonly encountered faults and method of interpretation. Fig. 4 represents the welded seam in a pressure vessel designed to operate at 1000 pounds per square inch working pressure. This gave every indication of not being chipped and the macrograph which constitutets Fig. 3 substantiates this belief. It is evident under side of first weld was not chipped before the bead was laid on the reverse side. This type of welding results in a stress concentration in the unwelded portion, which is highly undesirable. As far as external appearances are concerned, it is impossible to locate welds of this type. If it were not for radiographic detection, welds of this nature might be more prevalent than they are today.

In a welding groove, an inexperienced operator is apt to undercut the side walls. This in itself is not serious were it not for the fact that the subsequent welding bead usually traps slag in these undercut locations. Fig. 6 shows how the X-ray indicates this type of trouble.

Fig. 7 is a macrograph showing the actual defects found at the four locations when the welds were sectioned at these points. True, they are not serious, but they do indicate undercuts along the side walls, resulting from improper welding and cleaning operations.

Fig. 9 shows two welds, one of them quite good and the other containing innumerable porosities. The first picture would be considered a good weld and the second would necessitate removal of the welded seam and a reweld job.

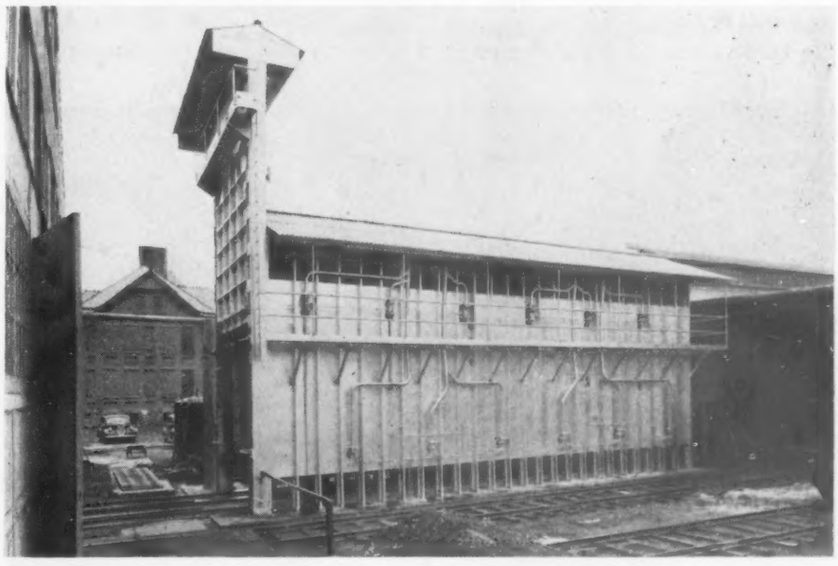
Fig. 10 points out two types of weld difficulties. One of them shows the location of slag which must be removed, in the welding groove, and the other shows the presence of undercut along the overlay beads. These could be removed by a visual examination, of course.

It is evident that intelligent use of X-ray equipment may be accompanied by greatly improved welding. At the plant mentioned, routine welding on vessels not subject to radiographic examination now exceeds the best welding level attained prior to acquisition of the X-ray machine, due largely to experience in welding procedure developed by use of the machine.

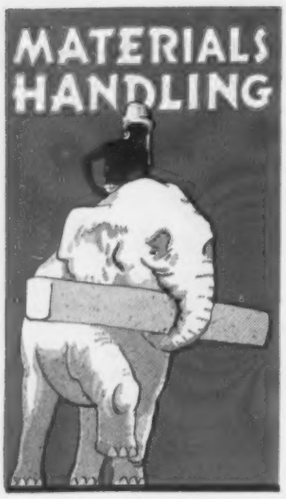
Weld Deposit Certified

■ Certification of weld deposit analysis rather than wire analysis now is contained in each package of certified stainless electrodes offered by McKay Co., McKay building, Pittsburgh. Spatter-free within practical limits, these electrodes are claimed to give instant contact.

Anneals Welded Tank Cars



■ **Equipment installed recently at the Milton, Pa., plant of American Car & Foundry Co. for the manufacture of fusion-welded tanks included this car-bottom, stress relieving and annealing furnace, built by Morris Engineering Co., Philadelphia. It has a capacity of 600 cars per month. Typical annealing cycle for a 33,000-pound tank is 7¼ hours, including heating up to 1550 degrees Fahr. and cooling, with an oil consumption of 306 gallons. Furnace was lined with Babcock & Wilcox insulating firebrick**



Strip Welding

Highest possible efficiency of handling operations is a most essential requirement of modern strip welding lines. Latest procedure, equipment and methods are detailed here by an engineer who has specialized in this field

By D. A. McARTHUR
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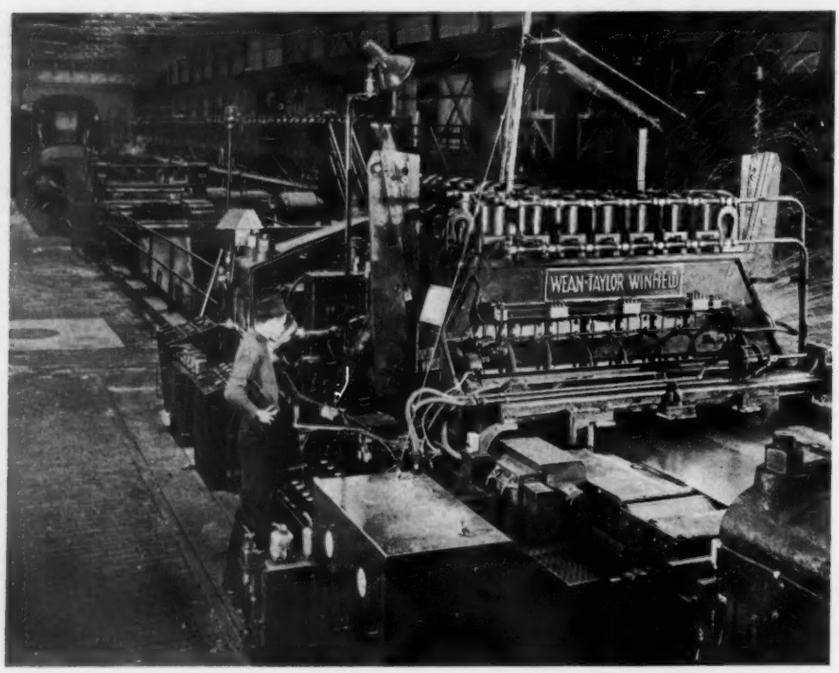
■ THE INCREASED speed of modern continuous pickling lines and continuous rolling mills has emphasized the problem of getting strip to the equipment and taking it away at the other end. If maximum output and hence maximum return are to be realized from modern continuous equipment, the first essential is to get the raw material to the machine without interrupting operation of the line.

For instance, the two methods most widely used for joining ends of succeeding coils are stitching and flash welding. In the former, the trailing end of the old coil and the leading end of the new coil are lapped, and at several points fingers are punched and formed around to make interlocking hooks, thus securing the two ends together. Time to make a stitch may be as low as one or two seconds.

This is extremely fast compared to welding, which requires 30 seconds maximum for the flashing period with ¼-inch plate to which must be added time required for lining up, for upsetting and for trimming. This means that ends may be stitched in about a minute less time than they can be welded. Usually it requires a minimum of about 1½ minutes from the time the strip hits the spacer bar on the welder until it is clamped, welded, trimmed and ready to move forward, but a smooth-working crew may cut this time somewhat, it is believed.

While the stitching operation itself takes only one or two seconds, total time to make a stitch is about 1½ minutes, the additional time being necessary to shear the two ends and line them up in the stitcher. This compares with a total time of about 2½ minutes to make a weld which in addition to the 1½ minutes for actual welding, requires about a minute to fit an end into the uncoiler, shear it and move it up to the welder. Thus total time to make a stitch is usually about a minute less than for a weld.

However, these fast welding speeds are only possible with the newer welding machinery which has greatly decreased welding time. In a pickle line at a large mill, 82 welds have been obtained in an 8-hour turn, about 10 per hour, making triplicate coils (total of 82 welded end joints and 41 stitched joints). At this plant it is believed that it is not impossible to get 100 welds per turn. At another plant where short coils are used, as high as 150 welds have been obtained in an 8-hour turn.

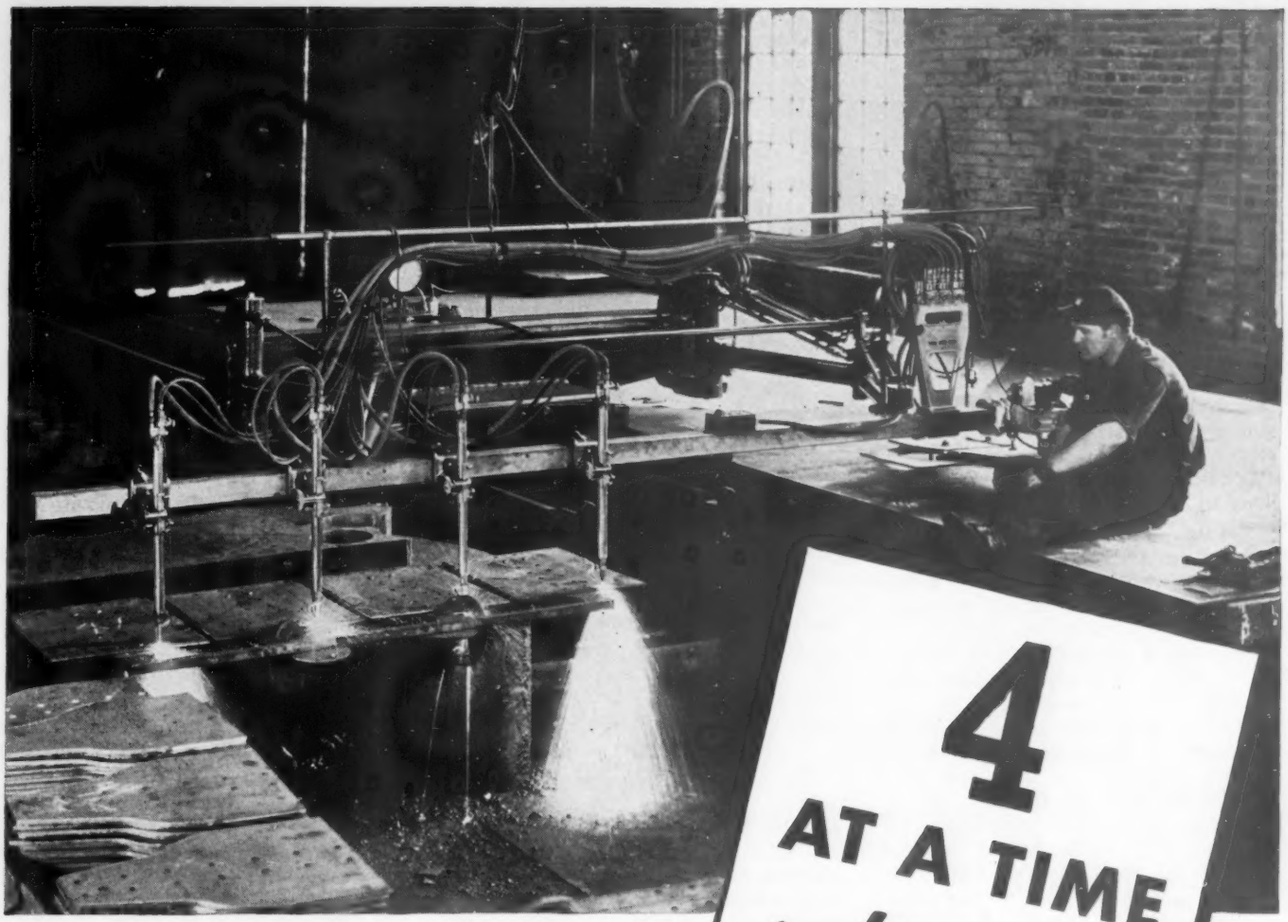


Resistance welding equipment by Wean-Taylor Winfield serving a continuous pickling line

Control Location Important

Thus, success of a flash welder joining strip is not only a matter of obtaining the required weld quality, but of doing it with the least possible loss of time. Location of controls is most important. The operator must be able to work his controls as an ordinary man drives his car—that is, automatically and without hunting for the correct lever.

Assuming that a coil is running through the line and the end approaches, the first problem is to get the front end of the next coil started into the line at the quickest pos-



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sible moment. For this discussion it is assumed that two uncoilers and two shears are economically out of the question. While ideal from the operating standpoint, two units would double the investment at this point.

McKay Uncoiler

It is believed the McKay processing uncoiler with cradle car is as present the quickest way to get the next end started. As soon as tail end is out of the uncoiler, another coil is all set to enter into the pinch rolls and the new end is coming out of the uncoiler long before the man at the welder is ready to take it.

It is interesting to see what happens to this end.

Assume tail end of preceding coil is stopped and sheared off by the operator, who then moves it away from the shear and starts positioning it for the weld by running it up against a spacer bar and clamping it. While this is being done, the leading end of a new coil is out of the uncoiler and ready to start. A control is arranged at the shear so the assistant can take the new end, feed it by the uncoiler up to the shear, shear it and start up through the welder. With everything working all right, the new end is coming up just as the man at the welder is ready for it. This practice is just about as close to the ideal as it is possible to obtain at this time.

Thus with the tail end of the preceding coil in position and clamped, a few feet away comes the front end of the new coil which the operator then takes on up and runs to spacer bar where it is clamped. This is followed by the welding operation.

Time required to get the completed weld over to the trimmer and trim it is extremely important. The distance is about 6 feet. It has been found that it is quite desirable to have several speeds, as the strip must be moving slowly to stop accurately, yet if it moves at 4, 6 or 8 feet per minute, it takes almost a minute to get there. Thus it must go faster. That involves control of speed so operator can speed up movement and then slow it down to make an accurate stop.

Operator Positions Strip

While various devices have been developed to stop the strip automatically in position for trimming, it is a hard problem and appears not yet practical. Lost time now is only a matter of a few seconds in getting a weld moved to the trimmer and centered for trimming. This leaves little to be gained by automatic devices. It is largely a matter of having correct speed controls and an operator with sufficient experience.

With the weld positioned and centered, the operator merely pushes a button and the following operations of clamping, trimming and unclamping are completed automatically. Details of trimmer and its operation will be presented in a later article.

Next thing is how fast can a coil be removed and work started on a new one? Speeds have been stepped up and up to eliminate lost time at this point. While comparatively high speeds are now being used in many plants, it is expected that maximum running speeds of picklers and cold mills will continue to increase. This means that the entry machines must be run at extremely high speed in order to make up for time lost at the welder, during which period of course strip has been running through the line at uniform speed. Thus 300, 400 or more feet of material have run through the line during the welding operation, so entry machine must be run at high speed to compensate.

Next point is to provide plenty of storage space for the welded strip, which means an ample looping pit, a certain amount of water in pit so the coils will not scratch and good guides in pits to keep plates from falling over. If strip is 60 or 80 inches wide, it stacks up nicely without falling over, but if around 24 inches difficulty will be experienced without guides. So guides must be adjusted and fast, too, if lost time is to be avoided. This quick adjustment of guides is one of the principal factors in looping pit design.

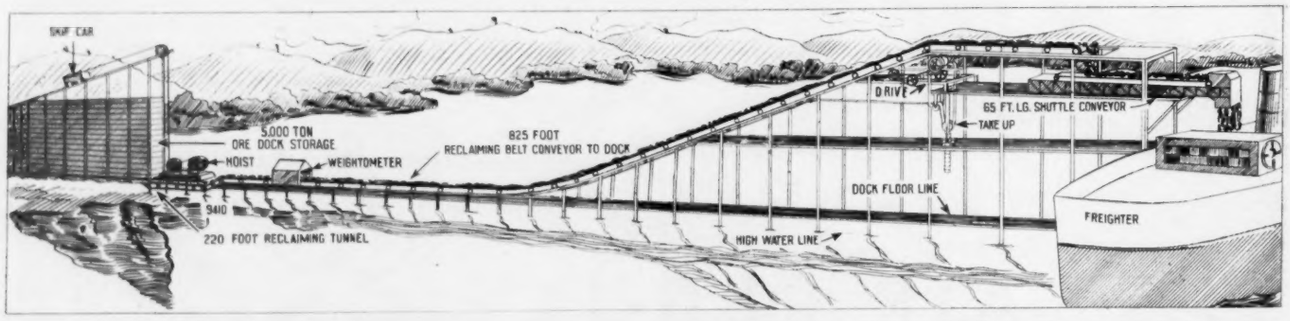
Alignment Important

A most important item is accurate alignment of all strip-handling equipment. Even though good welds are obtained, difficulty will be experienced in the line unless the new strip accurately follows preceding material. Thus guiding is extremely important both at shear and welder. The material must be cut so it lines up accurately at the welder.

It is essential to have the coil centered properly at the uncoiler. Then it must be fed straight into

(*Please turn to Page* 64)

Inclined Belt Conveyor Loads Iron Ore on Ocean Freighters



■ **This storing, reclaiming and loading system operated by Samar Mining Co., Samar Island, Philippine Islands, and furnished and installed by Stephens-Adamson Mfg. Co., Aurora, Ill., is capable of loading iron ore in ocean-going freighters at the rate of 200 tons an hour. Ore is brought from a mine 5 miles inland by 16-car trains and dumped by skip cars into a 5000-ton dock storage pocket built over a 220-foot reclaiming tunnel. One end of a belt conveyor 825 feet long receives ore in reclaiming tunnel. Coming out of tunnel, belt passes over a weightometer to weigh ore. A covering is placed over the conveyor on its way to the freighter. At top of incline ore is transferred to a shuttle conveyor which is adjustable for location of hatches on boats. Motor drive for belt is also at top of incline. Note weighted takeup for maintaining tension in belt. Approach pier, dock and conveyor are ½-mile long. In spite of native manual labor as low as 30 cents a day, this system is claimed to load ore at a favorable cost**

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25-15B

By EUGENE CALDWELL
Consulting Management Engineer
Milwaukee

The Value of a

Most important to successful employe relations are consistent labor policies. Details of what these may be and how to form a complete written "personnel policy" are given here by a man who has done much work in this field

■ MUCH EMPHASIS recently has been placed upon the desirability and importance of reducing a firm's personnel policy to writing. Almost everywhere we hear this. It has been mentioned in many articles on industrial relations. The following reasons have been advanced for establishing a written employe's relations policy:

So present and prospective employes can read over the policy and determine if they want to work for the firm or not.

To clarify in the minds of the worker what his status is in relation to his job and to the management of the company.

To clarify in the minds of the supervisory force what the policy of the company is to be in dealing with its employes.

To secure consistency in the treatment of labor, eliminating the accusation of favoritism.

There may be other good reasons . . . .

Much confusion appears concerning what is meant by a "labor policy" and as to what a written labor policy looks like. The dictionary defines "policy" as "the settled method or system of management by which any institution is administered." In a recent decision of the United States supreme court (National Labor Relations Board vs. The Sand Mfg. Co., 2LRR Man. 712, decision announced 2-27-39) it was stated that the "long course of conduct with employes is evidence of the employer's policies."

Be Consistent

Consequently when it is said that a company has "no labor policy" or at least "no well defined labor policy," it must mean there is no consistency in dealing with labor, decisions being made in one way upon a given occasion and in the opposite way in another case. Obviously nothing can cause more dissatisfaction in dealing with employes than to have one man think he has received an unfair deal compared with another fellow. Even if a particular practice is wrong, it is essential to have it consistently wrong, for in this way an employe at least knows where he stands and what to expect.

Lack of a consistent policy in government has perhaps been the most disturbing element in the New Deal administration. Since executives did not known what to expect, they have been afraid to do anything. Even more serious is inconsistency in dealing with employes. Although there is much controversy on almost every item connected with personnel relations, everyone agrees that whatever the policy on a particular point, it must be consistent.

Write It Down

Even though it is understood clearly what is meant by "labor policy," there is still great confusion on what to put in a written policy. Many of the larger firms have so-called written employe relation policies, some printed in booklet form and distributed to all the personnel, including the supervisory force.

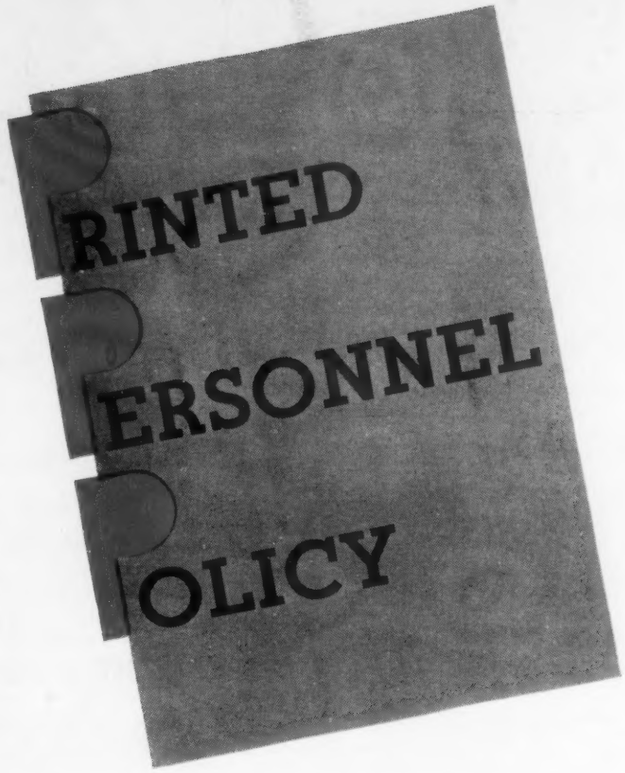
A considerable number of these so-called "policies" have been examined and all appear to fail badly in their attempt to express "the settled method or system of management by which the institution is administered." Most so-called written "policies" state a few high aims of the business and the desire of the management to deal equitably with its employes. Such statements of policy could be printed up in large quantities and distributed by all companies, because they set down only the great general ideals that should be in every company's Magna Charta.

Some of these "policies" recite the wages, hours and working condition clauses that are part of most contracts. Indeed it is quite desirable to have this information in the hands of each employe. Some companies have printed in booklet form the wages, hours and working-condition clauses from the union contract for distribution to all employes including those not belonging in the union. However, hours the plant works, minimum rates paid and similar items soon become obvious without distributing the matter in written form. As a matter of fact, same thing may be accomplished by posting such information on the bulletin board.

Consequently all of these so-called written labor policies fail under the first reason for reducing them to writing listed above. No prospective employe could read over such a "policy" and determine if he would like to work at your plant, unless it should be that he objected to working 40 hours a week or thought the minimum rates was too low.

Make It Clear

Likewise the second reason is not satisfied, because there is not much clarification in the mind of the worker as to his status or the relation of his job to the management. The third point is just as poorly satisfied. Upon various occasions the thought has been expressed that the



supervisory force should read over the personnel policy as any foreman not thoroughly in accord with it should not attempt to sell it to the workers. Such men should be transferred to work other than supervision or else obtain a connection where labor policies are more in harmony with their ideas. However, usual written "policies" do not go sufficiently into detail for a supervisor to determine if he is in accord with them or not.

Perhaps the fourth reason, that of securing consistency, is satisfied insofar as the items covered are concerned. However, there are too many ways that decisions in individual cases can be made and still not violate so-called statements of policy. For example, here are some of the questions that are in the worker's mind and which are not answered by any of the so-called written employe relations policies I have seen:

Does the company hire men over 40?
What is the attitude towards married women in the office?
How long are salaries paid in cases of illness?
How are salaries figured for persons who begin work after the first of the month or quit before the end of the month?
Are vacancies filled from the outside or by promotion from within the organization?
When a person becomes expert in a job, is he kept there because of the trouble in training a new man?
Can leave of absence be obtained and for how long without affecting the continuous service record?
How long can group life insurance be carried in case of lay-off or leave of absence?
What penalties are used for infraction of company rules?
Where an employe is held responsible for a given function, is this coupled with authority?
Are orders given an employe over the head of an immediate supervisor?
Are employes criticized in the presence of other employes of equal or lower position?
What is the attitude concerning hiring relatives of present employes?
What is learned in separation interviews?
Are regular inspection trips made to determine working conditions?
Do personal qualities or mechanical ability govern in the selection of a foreman?
Is there a credit union in operation?
Does the company provide any opportunities for investment for employes?
Is study in night or correspondence schools subsidized?
What is the attitude regarding withdrawals before pay day?
What is done in case of garnishee against the earnings of an employe?
Has the importance of various jobs been analyzed and a general system of promotions decided upon for use when vacancies occur?
Is your industry seasonal so regular periods of unemployment exist?
What deductions are made for tardiness?
What is the policy concerning telephone calls to employes, or visitors to see employes in the plant?
What is the penalty for being absent without having given notice? . . . . and thousands of similar questions. These are just a few of the things an employe or prospective employe would like to know about a company's labor policy.

It is the writer's contention that dealing with one's own employes is much like the government's dealing with its people where, to be consistent, all decisions above the most trivial are recorded. Then before each new decision is handed down, previous decisions are reviewed to take into account any similar circumstances and to be sure the new decision will not be inconsistent with the old.

In industrial relations, the so-called written labor policies which merely state lofty aims should supply no more than the "constitution" of employe relations in the enterprise. Written labor policies, of the second type, those reciting wages, hours and working conditions, are analogous to "statutes" or general company rules. Actual decisions made in individual cases should be written down to form the "common law" of the institution.

The desirability of reducing to writing every single decision made in a case involving an employe and his relation to the company cannot be emphasized too strongly. These decisions should be indexed carefully and kept readily available. Not only is this necessary for consistency in handling labor, but in many cases it saves deciding the same thing all over again under identical sets of facts.

Keep A Record

Some personnel authorities insist that there should be no uniform formula for dealing with employes but that each case should be decided upon its own peculiar set of facts. Granted that this is so, there still is a great need for reducing all decisions to writing so inconsistencies may be avoided where facts are similar. There is no other way to avoid the accusation of favoritism.

Thus a personnel policy is not something that one can sit down and reduce to writing in an hour or two. It must grow over a period of many years. Thus, the longer a company records these decisions, the better defined its policy will become on the various points.

Much could be gained by analyzing such decisions and distributing them to employes from time to time. In this way, each employe as well as supervisor will have a thorough understanding of the company's labor policy. Of course some of the decisions probably should be withheld from the employe in advance

(*Please turn to Page* 66)

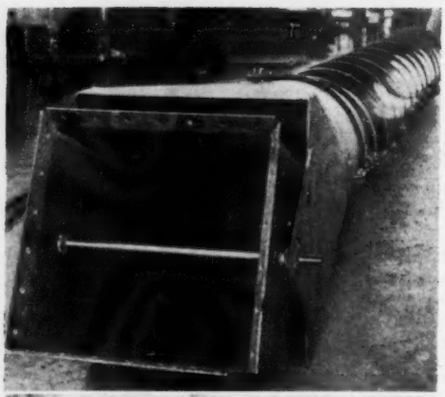
WELDING In Fabrication

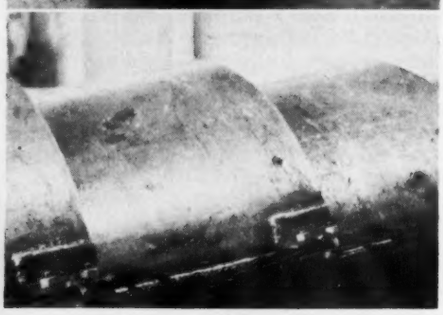
Marsh Buggy Has Welded Tires

■ Constructed by Stanolind Oil & Gas Co. in its Dallas, Tex., shop for transportation and exploration work in marshy sections, this marsh buggy is arc welded steel throughout, even to the tires which are large welded steel drums. Capable of carrying a 6000-pound load, buggy is powered by a Lincoln Zephyr engine, and has a speed of 2 miles per hour in water, 7 in marsh and 12 on the highway. Complete buggy weighs 10,000 pounds, is 21 feet long and is 15 feet wide overall. Wheels are 7 feet in diameter and 4 feet wide. Photo courtesy Lincoln Electric Co., Cleveland

Torch Bevels Heads Fast and Accurately

■ Wyatt Metal & Boiler Works, Dallas, Tex., employs the special setup shown above to prepare flanged and dished heads for welding onto bodies of vessels for oil refinery service. Head to be beveled is placed on a rotary table and a blowpipe is mounted in a holder. A shoe rides against flange of the head so torch will be same distance from edge of cut at all times. If a head is to be double beveled, two torches are used, setting each for the particular angle it is to prepare





Flexible Coal Chute

■ Resembling some fabled sea serpent, this flexible coal chute was welded by Hepinstall Steel Works, New Orleans. Flexible portion consists of 15 conical sections, 30 inches deep and 36 inches wide at top. These sections were cut from 1/4-inch steel plate, rolled to shape and arc welded from both sides. A chain secures conical sections in proper relationship by anchoring a link of the chain with a bolt between two angle clips, welded to upper edge and each section. Photos courtesy Wilson Welder & Metals Co., New York

173 Pieces Made Into One

■ View at left showing underside of all-welded steel trolley frame made by Cleveland Crane & Engineering Co., Wickcliffe, O. Several welds are required for each of the 173 pieces making up this frame. Complete trolley must be correct in measurement, absolutely rigid and have connections as permanent and as strong as the parent metal itself, as performance of entire crane depends upon this point

Mud Gun Features High Pressure, Capacity and Positive Positioning

■ Higher clay pressures than have been used before in blast furnace mud guns are attained by a quartet of newly designed guns recently installed by William M. Bailey Co., Pittsburgh.

These new units, designed and built on the principles of the electric gun first introduced by Mr. Bailey in 1928 and described in *Iron Trade Review*, Dec. 20, 1928, p. 1555, have been installed in four of the major iron and steel plants of the country. Two have been mounted on existing pedestals, while the other two are completely new installations.

With the clay pressure boosted to 600 pounds per square inch, it is possible for the operator to plug the tap hole against full blast pressure under any normal operating condition. The complete operation requires about 40 seconds. In addition to overcoming back pressure, this new gun provides a comfortable excess pressure to insure heavy compression of the clay during the plugging operation.

Two Units in Gun

Guns consist of two units, the carriage and the gun proper, both shown in accompanying illustrations. The gun itself is a combination screw and piston type. Piston rotates slightly during the operation which insures even wear on the barrel as well as reducing friction. A carrying capacity of 9.6 cubic feet in the barrel provides an oversupply of clay to make plugging sure. This large quantity of clay also makes "long holes," or plugs extending from the inside of the hearth wall to the face of the iron notch.

Three motor drives are utilized in the action. First one rotates the gun and carriage on its axis until the latching mechanism attaches the carriage to the furnace hearth jacket. A second drive then swings the gun into position in the tap hole, when the third goes into action to force the clay into the hole and compress it into position. The secondary action is positively controlled by means of levers, so the path through which the gun travels is identical on each operation. Thus it is obvious when the latching mechanism has positioned the carriage, the final position of the gun will always be the same—exactly in the tap hole. There is no danger of missing the hole, and thus remote control may be utilized safely and effectively.

Construction of the units is a combination of welded steel plate and steel castings, of sufficient size and weight to insure long service. New developments are covered by design patents, while the entire development is covered by method patent 1,780,485.

Side and front views of new Bailey mud gun for blast furnace use. Linkages afford positive positioning to eliminate any danger of missing the hole

Synthetic Enamels For Severe Service

■ A new line of high-speed synthetic enamels, especially suitable for use on metal products subjected to severe service, such as washing machines, refrigerators, kitchen cabinets, etc., has been developed by Maas & Waldstein Co., Newark, N. J.

These enamels, known as "Codur" enamels, are said to cut down the time needed for finishing and thus enable manufacturers to speed up production. They dry out of dust rapidly and bake in a few minutes to a fine finish that is durable and resistant to marring, moisture and the action of ordinary household chemicals. The baking schedule varies with the temperature, but at 325 degrees Fahr., 15 minutes is sufficient.

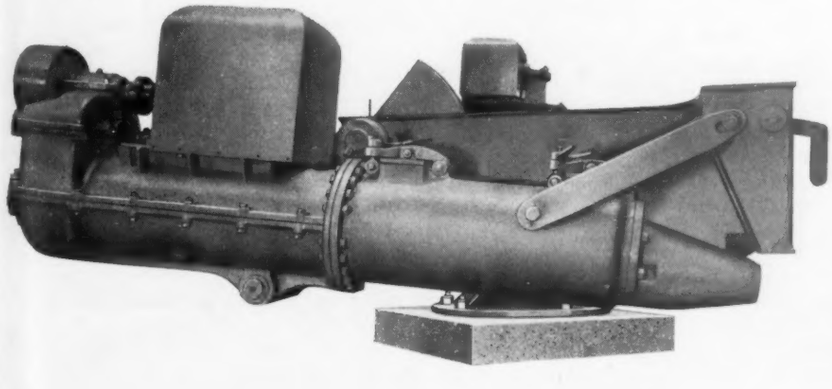
Codur enamels are furnished in all plain colors and also in colors with metallic lustres. They cover well in one spray coat or can be used over a primer. Enamels are supplied in types suitable for use on all metals.

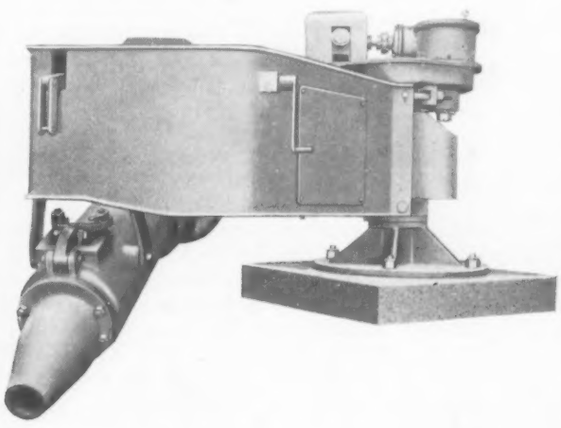
Perforated Rubber Used As Filter

■ Expanding air is used to put 1100 to 6400 holes of 0.012 to 0.004-inch diameter in rubber sheet known as Multipore made by United States Rubber Co., mechanical division, 1790 Broadway, New York. More holes per square inch and greater mechanical strength are claimed by manufacturers for this method.

Expanded Multipore, stretched before vulcanization, has oval holes and higher porosity than the plain Multipore. Multipore's advantages as a filter include absence of surface fibers, which facilitates removal of cakes formed during filtration and results in increased filtration speed. Percentage of moisture retained in cake deposited is equal to and often less than that of cake on canvas. Due to greater loss of fine particles into filtrate initially, filtrate solids are somewhat higher for plain and considerably higher for expanded Multipore than for canvas filter cloth. Multipore resists swelling in water.

Although no more resistant to deterioration by heat and chemicals than rubber in other forms, this material may be specially compounded to resist specific chemicals or operating conditions. Multipore is used in storage batteries to make paste retaining envelopes and in filters. Multipore is available in soft rubber, hard rubber, flexible hard rubber and Neoprene with backing materials to suit.





Galvanized Sheet

Welding by the carbon arc method gives good results with sheets as thin as 24-gage. Corrosion resisting properties of material appear only slightly affected. Recommended procedure is given in detail here

■ FOR A NUMBER of years, arc welding by the metallic process has made it possible for sheet metal shops, tin shops, heating and piping contractors to obtain a permanently leak-proof construction, simplicity of fabrication and low production costs, not to mention the benefit of quick concentrated heat which tends to prevent undue distortion and excessive disturbance to the galvanizing.

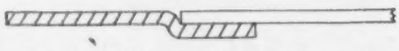


Fig. 1—Offset lap joint works well

Disturbance to the galvanizing with arc welding is only slight. The affected zone is quite narrow, usually only about 1/16-inch from the weld. Moreover, the affected zone still retains some corrosion resisting qualities.

Carbon arc welding permits extending the benefits of welded fabrication beyond what has been possible by other methods. The carbon arc not only has the quick concentrated heat of the metallic process but also provides an excellent bond in welds and little or no disturbance to the galvanizing since the heat is comparatively low and uniform.

Fig. 2—Setup for making lap joint

Use of such a low, uniform heat eliminates many of the troubles as too much heat in the work causes distortion and warpage. This is particularly apparent in welding galvanized material of 20 gage and lighter. Users report excellent results in thicknesses as light as 24 gage. The ability to weld this light material and to obtain the advantages inherent in welded fabrication at the same time is resulting in the adoption of this method by increasing numbers of sheet metal shops and other users of galvanized steel.

For satisfactory results, the carbon arc welding of galvanized steel must be done with direct current. Only with direct current can uniformly straight polarity, absolutely essential in this work, be obtained. Straight polarity, where the current flows from the electrode to the work, provides an arc which is easy to strike and hold with the carbon. The uniform direction of current flow also makes it easy to move the arc along the seam being welded, assures maximum welding speed and smooth dense welds, free from irregularities.

Fig. 3—Arrangement for a butt joint. All illustrations courtesy Lincoln Electric Co., Cleveland

Accurate Voltage Control Necessary

Also important in welding thin galvanized sheet is accurate control of voltage and current to give the proper type and size of arc. The importance of accurate control is appreciated from the fact that a difference of only a few amperes is required for best welding of 20 and 22-gage metal. The ability to make adjustments in increments as fine as desired may spell the difference between good and inferior welding.

A carbon of 5/32-inch diameter usually provides best results in welding galvanized sheet although 3/16-inch carbon has been found satisfactory on 16-gage material. The current used varies with the thickness of the work and ranges from 50 amperes for heavy metal down to 20 amperes for light gages.

The following procedure for carbon arc welding of galvanized steel is used by Flesch & Schmitt Inc., sheet metal fabricators of Rochester, N. Y. This company reports that carbon arc welding has proved the best method of carrying out its miscellaneous fabrication.

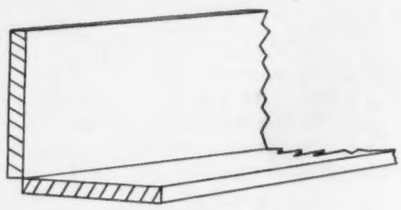


Fig. 4—Outside corner joint setup

First step is selection of a design to permit use of the joint most readily welded by the carbon arc process. The best possible joint appears to be provided when the work is passed through a roll or a press brake and given an offset lap as sketched in Fig. 1. This type of joint permits the weld metal to flow practically like solder. Moreover, on sheet metal work such a joint acts as a stiffener and prevents warping.

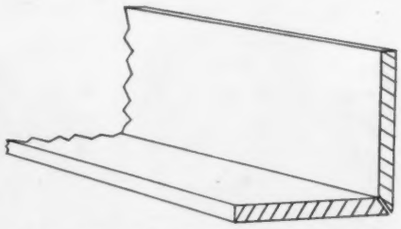


Fig. 5—Making inside corner joint

On contract work, offsetting may be undesirable due to its cost. In such cases the straight lap, Fig. 2,

2 NEW G-E ARC WELDERS

For Better Work—At Less Cost

(Left) 100-amp size Welding range: 25 to 150 amp. Handles 1/16-, 3/32-, 1/8-, and 5/32-inch electrodes

(Below, right) 200-amp size Welding range: 60 to 275 amp. Handles 3/32-, 1/8-, 5/32-, 3/16-, 7/32-, and 1/4-inch electrodes

Excellent results are obtainable with all good a-c electrodes, among the best of which are the following G-E types:

For welding in any position, Types W-25 and W-20.

For high-speed horizontal fillets and flat work, Types W-23 and W-24.

For high-tensile steel, Type W-54.

For cast-iron repair, Type W-80 and Type A.

WELDING light-gage steel is especially easy with either of the new G-E alternating-current arc welders because continuous control of current provides the exact adjustment needed for best results. On heavier work, too, better results, are obtained more easily, as arc blow is absent.

Because of their excellent stability, arc welding can be done in the vertical and overhead positions as well as in the flat and horizontal positions. Mild steel, high-tensile steel, cast iron, or any other metal for which suitable a-c electrodes are available can be arc-welded with either of these new welders.

Power costs are 40 to 50 per cent lower than with welders of the rotating type because efficiency is higher, idling losses are lower, and maintenance is practically negligible.

Both machines are thoroughly insulated with fireproof asbestos and woven spun glass for severe service. The welding circuit is separate and distinct from the power circuit, and all internal joints are solidly brazed for safety and durability. **Both welders meet the requirements of the latest Re-examination Service of Underwriters' Laboratories, Inc.**

These welders are priced at less than $1.00 per ampere, and we believe you will agree that they offer values which are second to none. These and all other types of arc welders, accessories, and electrodes are available through G-E arc-welding distributors or G-E sales offices. Ask one of them today for a demonstration, for a trial, or for help with your welding problems. Or send the coupon to General Electric Company, Schenectady, N. Y.

GENERAL ELECTRIC

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Please tell me how I can use these welders to advantage on my type of work. (Attach description.)

Please send me bulletin GEA-3081

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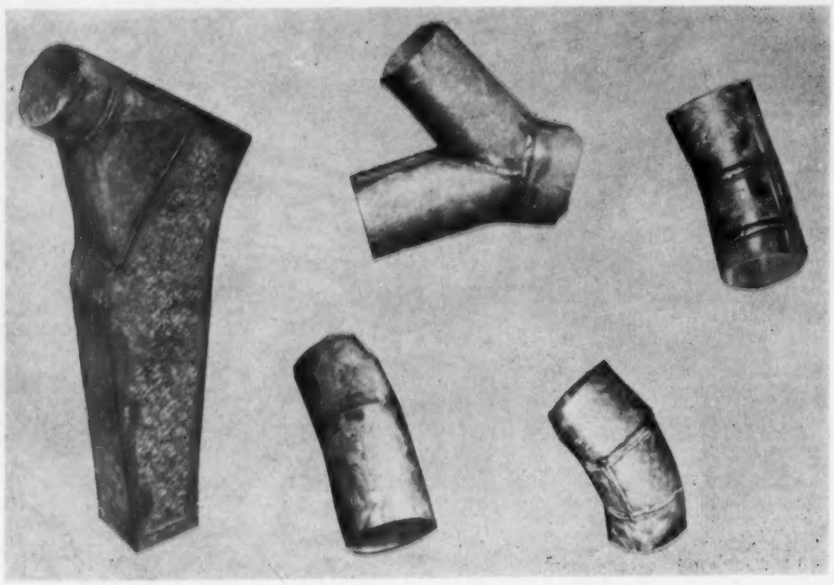


Fig. 6—Fittings made of galvanized sheet steel by the carbon arc

may be employed. This type of joint can be welded readily. It only requires tack welding the edges of the work with the carbon arc every few inches prior to start of welding. This not only simplifies the work but also prevents any possibility of the seam opening up.

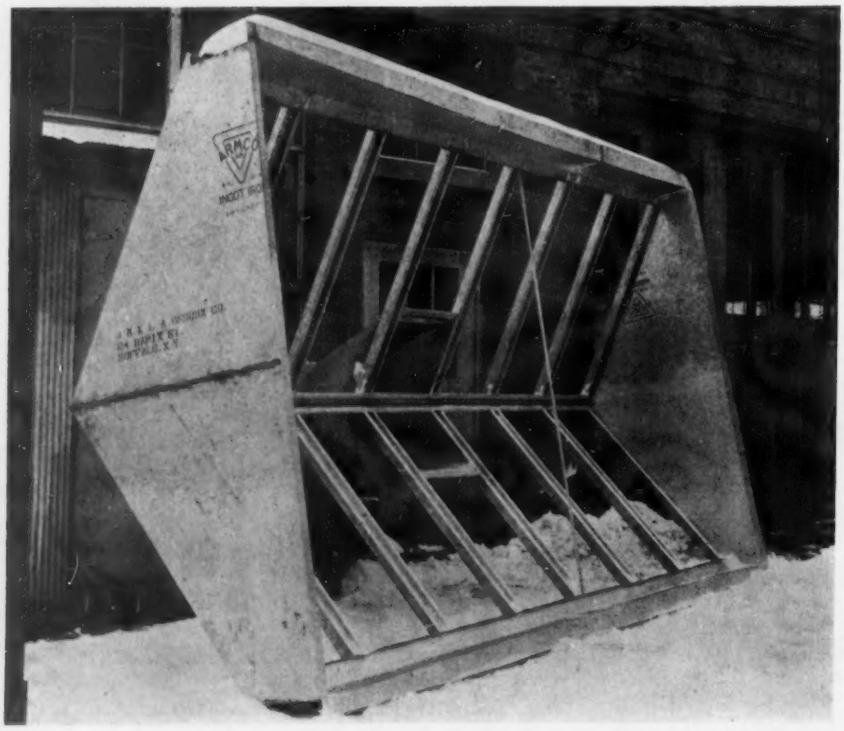
Keeping cost and requirements of the design in mind, if the offset lap joint and the straight lap joint are not feasible, then the plain butt joint, Fig. 3, may be utilized. Two other types of joints in the order of their relative ease of welding by the carbon arc method are the outside corner joint and inside fillet, illustrated in Figs. 4 and 5 respectively.

It is important to use a carbon which has a long, thin taper. A standard 5/32-inch carbon is ground on an emery wheel to a 4 or 5-inch taper, with a small point. A suitable type of electrode holder is used and the carbon is held so it extends out about 1½ inches. This enables the carbon to keep itself necked down with proper taper.

During actual welding, filler

(*Please turn to Page* 65)

Fig. 7—Carbon arc welding was used to fabricate this galvanized skylight



Introduces New Air and Magnetic Circuit-Breaker

■ Test demonstrations of two new oil-less circuit breakers of revolutionary type, the "Magna-blast" and the air-blast, were made at high-voltage laboratory of General Electric Co., Schenectady, N. Y., Aug. 7, before approximately 250 utility, railroad and industrial engineers.

The "Magna-blast", so called because it interrupts its arc magnetically, uses an entirely new principle in fast circuit interruption in air and is intended for 5000-volt service at interrupting ratings up to 150-000 kilovolt-amperes. The air-blast breaker is designed for 15,000-volt service at interrupting ratings up to 1,500,000 kilovolt-amperes and utilizes a blast of air built up under high pressure to interrupt the circuit and break the arc. The stream of air also removes the arc products, causing the circuit to be interrupted at first current zero after the contacts have been parted.

Both breakers were designed to permit standard arrangement of buses, current transformers, mechanical interlocks and associated devices. Each breaker is assembled and shipped as a single unit. Size of the new breakers is smaller than that of oil breakers in comparable ratings.

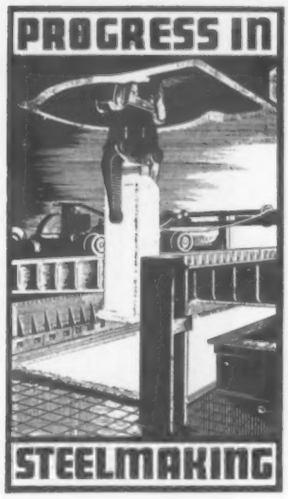
Fundamentals of Design In Machinery Field

■ *Machine Design*, by Stanton E. Winston; fabrikoid, 333 pages, 5½ x 8¼ inches; published by American Technical Society, Chicago; supplied by STEEL, Cleveland, for $3; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London S.W. 1.

The author, associate professor of mechanical engineering, Armour Institute of Technology, Chicago, has provided a text presenting those fundamentals of theory and analysis basic to the field of machine design. The field is broad and offers many specific lines capable of specialization but underlying the entire field are many fundamentals and much factual information with which the prospective designer of machines or machinery must become acquainted.

In this volume selection has been made of material basic to the general field, to bring to the student the general idea of analysis which permeates the entire field of design.

Solutions of many examples are included in the text to allow the student to appreciate the reasons for the various steps and obtain the sequence of thought they present.



Steel Plant Operation

Modern instruments prove valuable in quickly solving wide variety of mill problems, check performance of new equipment and efficiency of old, show how to obtain most efficient operation, point out trouble and remedy

By R. J. KRYTER
Esterline-Angus Co.
Indianapolis

■ IN PLANTS having heavy electrical demands it is not unusual for starting loads to produce a peak which will create a high maximum demand for the month, due to pyramiding of peak loads on the various individual machines. By slightly staggering the starting time it has been found possible in many plants to reduce the demand cost considerably.

Similarly, where power factor is an element in fixing power costs, a chart record furnishes a guide in the operation of corrective equipment and thus helps maintain a high ratio of efficiency.

The importance of power factor determination is revealed by the case of a middle western steel mill which produces most of its power by using blast furnace gas for firing the boilers. The coal handling plant at this mill is at the end of a 2300-volt line 1000 feet from the powerhouse, and most of the coal handling equipment is driven by induction motors with a low power factor.

To improve efficiency of power utilization it was necessary to raise the power factor, and therefore a synchronous motor was selected to drive the coal crusher. Addition of this motor raised the power factor point from 60 to about 80 per cent, an improvement which enabled the 100 kilowatt load of the hammer mill to be added without actually increasing the kilovolt-ampere demand of the plant.

This is the fourth of a series of articles appearing in STEEL dealing with modern rolling mill control. The first appeared July 3, 1939, p. 52; the second, July 17, 1939, p. 63; the third, Aug. 7, 1939, p. 63

Fig. 1 indicates the power requirements necessary to drive a group of machines with variable loads in a steel plant. In this instance it was necessary to select a motor which would be well loaded normally so as to operate at good efficiency and power factor. By the aid of the chart, a 25-horsepower motor with a fly wheel was found to handle the load economically.

On another instance, a bar shear was driven by a 15-horsepower squirrel cage induction motor. A record of the load, Fig. 2, shows kilowatt consumption while cutting high-carbon steel bars 7/16 x 1½ inches. The chart indicated that average input to the motor with the shear running idle was 1 kilowatt and only 1.4 kilowatts with the shear in operation. This showed that the work of shearing the metal was done almost entirely by the energy stored in the flywheel, so it indicated a 2-horsepower motor would be ample.

To allow adequate capacity for carrying the overload at the instant of shearing and to permit cutting heavier bars, a 3-horsepower motor was substituted for the 15-horsepower motor with decreased investment, higher efficiency and better power factor as a result. Most steel mill machinery comes in the classification of equipment which can hard-

Fig. 1—Group drive checked from this chart

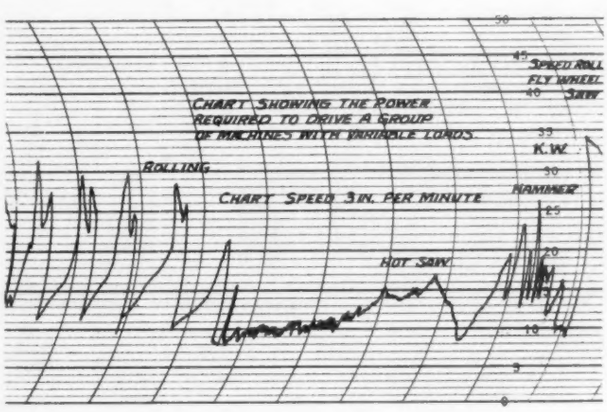
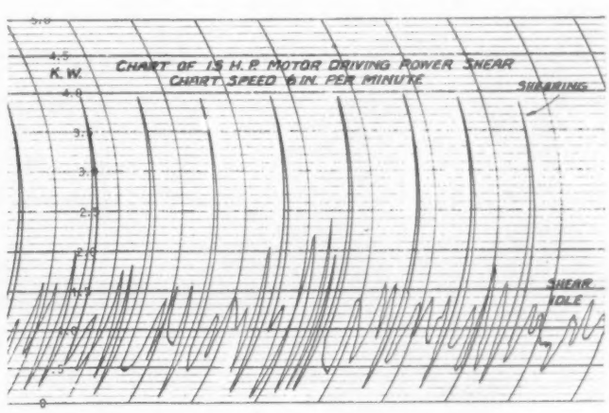
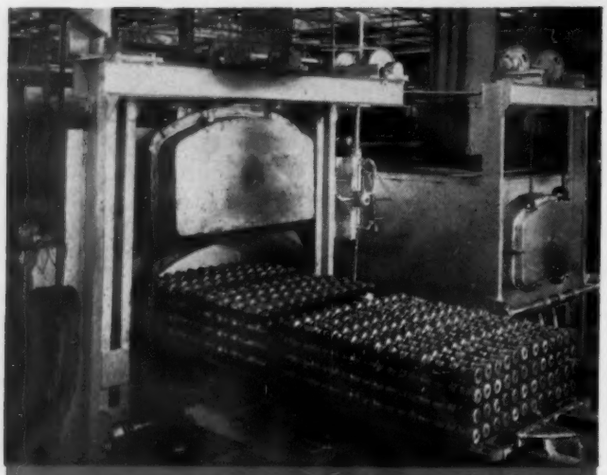


Fig. 2—Power shear load study





Carburizing camshafts in a modern automobile plant.

Fabrication by welding.

NATIONAL METAL EXPOSITION

INTERNATIONAL AMPHITHEATRE
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OCTOBER 23-27

PARTICIPATING SOCIETIES

American Society for Metals
Wire Association
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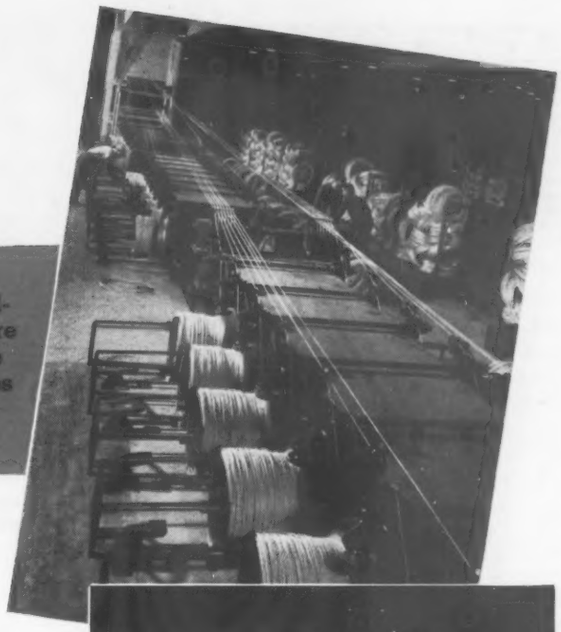
METAL SHOW ISSUE OCT. 16th

Studying metal structure microscopically



Electro-galvanizing wire at the rate of 578 miles per day.

Open-hearth pouring.

■ **The latest methods, materials, equipment and metals will be on display when the twenty-first National Metal Congress and Exposition is in session at the International Amphitheatre, Chicago, Oct. 23 through 27. The papers presented at the business sessions will reflect the best thinking and most exhaustive research done over the past year. This is truly the "metal man's" greatest opportunity for an interchange of ideas and to learn of the latest developments.**

Following its usual custom, STEEL will devote a large part of the October 16 issue to the same interests as the various societies participating in the National Metal Congress. This issue, dated just a week prior to the opening of the show, will carry complete advance details so that you can lay your plans as to the papers you wish to hear, the things you wish to see and the booths you would like to visit.

Our October 16 issue will contain a combined advertising and editorial insert section printed in two colors on special coated stock. This insert section will carry the complete program and list of exhibitors. In addition, it will feature pertinent comments by men known and respected throughout the industry. It will have a profusely illustrated section depicting the progress and achievements of the past year.

The advertising pages will inform you of the newest money saving equipment; of better methods; of improved materials and metals. If you attend the show, STEEL'S October 16 issue will help you to profitably plan your time. If you can't attend, this issue will bring the show to you.

Companies supplying equipment, materials, methods or metals are invited to write for information relative to advertising possibilities.

STEEL

PENTON BUILDING • CLEVELAND

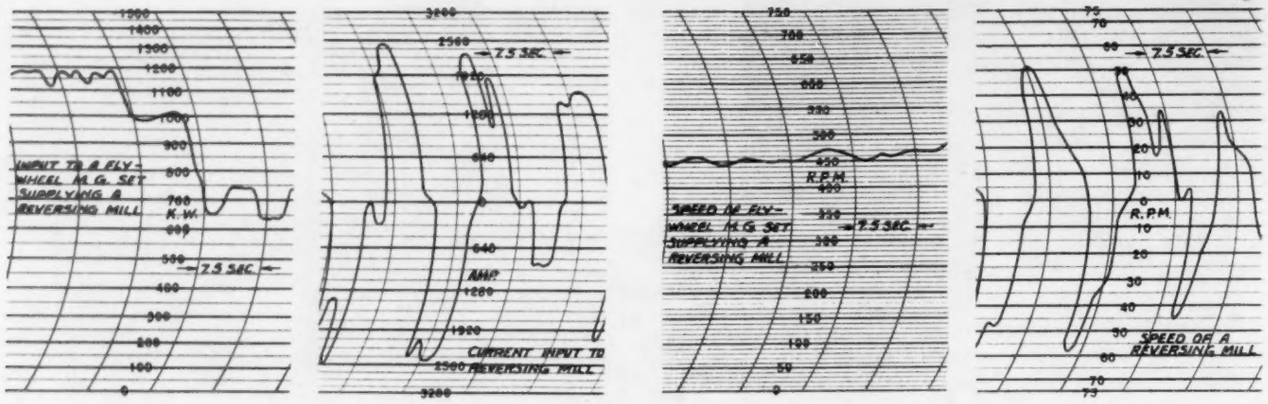


Fig. 3—Left to right, study of power input, mill motor current, flywheel speed and reversing mill speed. All records made simultaneously

ly be tested in a laboratory; studies must be made on machines while in actual production. Also, every new development in steel mill equipment must be tested thoroughly in actual use to prove its advantages before to prove its operation and to obtain data on which to base the next forward step.

Charts in Fig. 3 form a typical example of how engineering data can be obtained easily under conditions when values measured vary so rapidly that indications of ordinary instruments could not be read accurately. The recording meter here indicates kilowatt input and speed of motor-generator set with a flywheel used to furnish current to a motor driving a reversing mill. Note that charts two and four in this group have zero at the middle of the chart. The motor-generator set consisted of a 1800-horsepower alternating current motor connected directly to two 1200-kilowatt direct-current generators and a 50-ton flywheel. Effects of the flywheel in damping out fluctuations of the load imposed by the mill motor is clearly shown on the chart of the input to the motor-generator set. The changing speeds of the set necessary to permit the flywheel to store up and to deliver energy, are shown in the tachometer chart, while the ammeter record shows the extremely fluctuating character of the input to the mill motor.

Checking operation of new equipment is always of extreme importance. Charts were obtained in trying out different methods of regulating the input to a motor flywheel drive for a plate mill. One showed kilowatt input using a magnetically-operated regulator and another portion showed input to the same motor with the same load when controlled by a liquid regulator. In this instance, perhaps further adjustment of the magnetic regulator might have overcome the extremely erratic action revealed. However, such charts serve to show how conveniently the operation of new equipment may be studied by this means.

Recording Meter

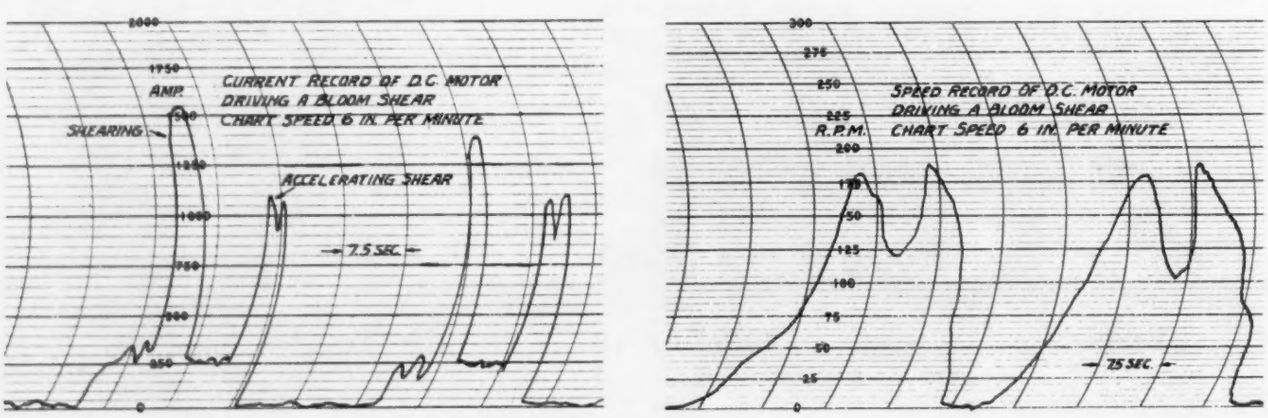
In changing equipment and drives, the recording meter also may be of aid. For instance, a bloom shear with a capacity sufficient to cut 108 square inches of metal at 1500 degrees Fahrenheit was equipped with an 8600-pound flywheel and driven by a 200-horsepower induction motor geared to make 14 strokes per minute. Although not used continuously, the energy and time required to bring the heavy flywheel up to speed and the time it continued to run after the power was shut off made intermittent operation of this unit impractical.

The question was raised as to advisability of equipping the shear with a high-torque motor, eliminating both clutch and flywheel. This would permit shutting the shear down when not actually in use. To get the answer, a temporary direct-current motor was coupled directly to the shear and charts made of motor input and speed.

Fig. 4 shows the sections of simultaneous charts with the shear cutting five 4 x 4-inch billets at one stroke. These records conclusively established that the clutch was not needed, and that the flywheel could be removed and the shear started when needed. A 350-horsepower 250-volt direct-current motor designed to operate at 175-200 revolutions per minute was installed and supplied with magnetic control and dynamic braking. This eliminated a continuously running motor drawing energy all the time and resulted in a considerable saving of power in this instance.

In another instance, an eastern steel mill installed a large slab squeezer, used to reduce the cross-section of large slabs of steel. Due to the rush of work, the unit was put in service without the usual check-up with graphic instruments, although an acceptance test was the standard practice of this company. Everything went well until a 2-inch

Fig. 4—Simultaneous records of current and speed on a bloom shear


AMP.
CURRENT RECORD OF D.C. MOTOR DRIVING A BLOOM SHEAR CHART SPEED 6 IN. PER MINUTE
SHEARING
ACCELERATING SHEAR
7.5 SEC.
R.P.M.
SPEED RECORD OF D.C. MOTOR DRIVING A BLOOM SHEAR CHART SPEED 6 IN. PER MINUTE
7.5 SEC.

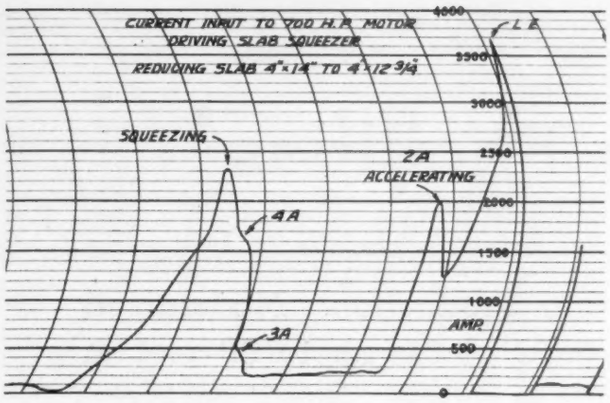


Fig. 5—Current to slab squeezer motor

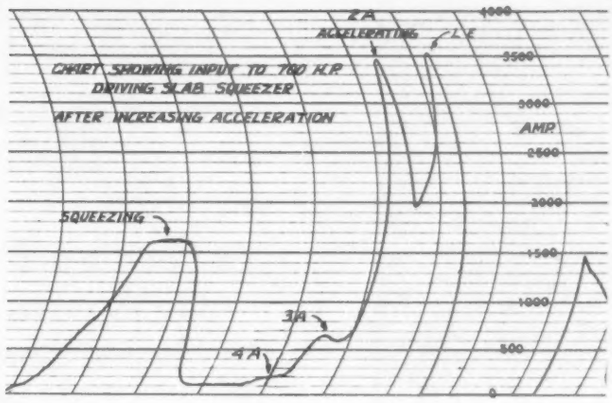


Fig. 6—Current to same motor after increasing acceleration

reduction in a 6-inch slab was undertaken. Then the overload devices on the 700-horsepower motor driving the machine kicked out and it stopped.

When this happened, graphic instruments were immediately applied and produced the chart shown in Fig. 5. This record clearly shows that when the machine was handling a 4-inch slab and reducing it from 14 inch to 12¾ inches in width the squeezing operation began before the third and fourth steps of the controller had operated and before the motor was brought up to full running speed. The result was the motor was being thrown across the line while under a heavy load. When the 6-inch slab was encountered, the load rose to the point where breakers tripped the machine out.

With controller relays reset to bring the motor up to speed much more quickly. Fig. 6 resulted. This shows the current drawn when squeezing a slab of the same size as that in Fig. 5, but the working load had been reduced from 1320 to 1620 amperes.

Trouble in another instance was encountered in an eastern wire mill where a 60-horsepower motor was repeatedly overheating. Examination of the load with a recording wattmeter indicated a great many starts and stops were being made, which might easily have caused the overheating.

Investigation revealed that the mill was frequently stopped to insert a new coil of wire. The engineer suggested a spot welder be used to join the coils of wire so it would be unnecessary to stop the machine. When this was done, the overheating ceased, controller maintenance was reduced and much time lost previously in starting and stopping the machine was now saved.

Synchronized Charts Obtained

In another instance four large motors, 600 to 800 horsepower each, driving a mill supplied by a motor-generator set, would not maintain their speed under load. In this instance with the motors driving individual stands of a tandem mill, it was most essential that the chart records be perfectly synchronized. This was necessary so that the charts obtained could be compared accurately. To do this, the graphic meters were equipped with chronographs and a contact-making clock arranged to operate these stands simultaneously. This made accurate correlation of the charts possible. On each of the four motors an ammeter and speed recorder were used. Two voltmeters recorded voltage at the generator and at the farthest motor. A speed recorder checked the frequency of the motor-generator set.

Charts obtained indicated that the trouble was due to incorrect voltage regulation of the generator of the motor-generator set. This ended all argument and definitely located the responsibility for the difficulties as well as indicating how the trouble might be overcome.

Not all difficulties, however, are connected with machine drives. For instance, one large steel mill had some difficulty with the pit crane hoist. Series brake coils began to burn out in rapid succession. Before intelligent repair work could be done, it was necessary to find out why the failures occurred.

A recording ammeter connected in the circuit of the hoist motor was employed having a center-zero chart, since this was a reversing motor being tested. Fig. 7 shows the chart obtained. This shows that even when running without any useful load, the motor drew 250 amperes of current. The hoisting current also was excessive. Hoisting an ingot from the pit required 150 horsepower to start and 110 horsepower to run. Then

(*Please turn to Page 64*)

Fig. 7—Chart of pit crane hoist showing extremely unsatisfactory operation

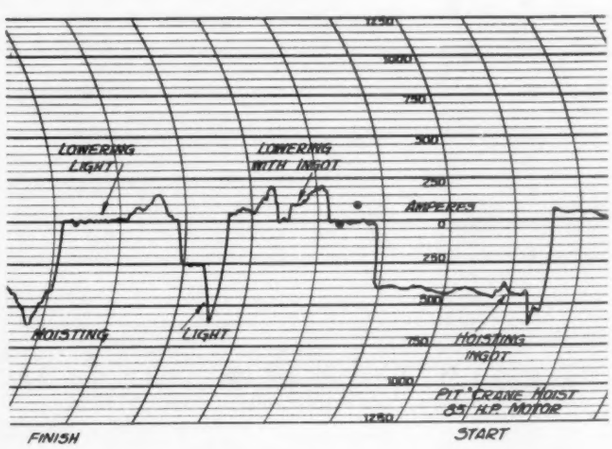
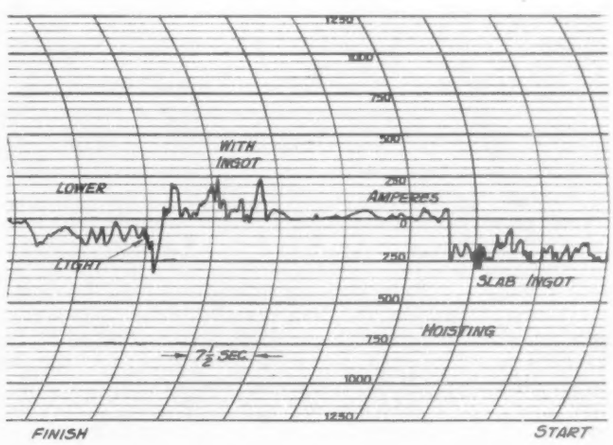


Fig. 8—Chart of same unit after trouble had been corrected



New Facilities

In hot-dip galvanizing department are installed without interrupting production. Modernized equipment can handle pieces up to 60 feet in length, 6000 pounds in weight. Small parts are handled in separate line under a monorail

By **ALBERT L. JACKSON**
Plant Manager
International Derrick & Equipment Co.
Columbus, O.

■ WHEN the International Derrick & Equipment Co., Columbus, O., desired to modernize and enlarge its hot-dip galvanizing department, it was imperative that this be done without interrupting production in any way.

For almost 20 years, the oil-producing world has been familiar with Ideco galvanized steel derricks, many of which are in use today. The long life is due in no small measure to the hot-dip galvanizing given all parts of these derricks. Recently activity in this field and a larger demand for high-grade galvanized coatings on other types of steel structures made in this plant demanded enlargement of the galvanizing department. In making the changeover from the old to the new equipment, a layout was first prepared without regard to existing equipment and its relative location. This layout was checked carefully and changed until it met the final requirements. Since it was necessary to carry on regular galvanizing operations during the remodeling, a schedule for every phase of the work was set up so no production would be lost.

Briefly, the plan was carried out as follows:

The south wall of the building was wrecked and new foundations placed for a 20-foot extension to the crane bay in which the department is located. New sewers were installed and a new acid-proof floor laid as far as equipment being used would permit. This area is in lower left portion of Fig. 2.

Next, two new pickling tanks and one rinse tank were installed in the area adjacent to the south wall, that is, in the floor space made available by the addition. This permitted wrecking and removing the old pickling tanks from the other part of the room and putting in new floors over the entire department.

Following this, a new 30-foot galvanizing kettle was built and installed in a new location shown at K in Fig. 2. As soon as it was ready to operate, spelter was moved from the old kettle to the new one during a week-end.

When this was done, the old kettle and furnaces, which were directly in the path of the new enlarged pickling room, were removed. Next, the pit where the old kettle was located was filled up and the pickling floor laid over it to make room for six 30-foot tanks as well as an alkaline cleaner tank and other cleaning equipment.

Shipping Bay Enlarged

During the above operations, an 80-foot extension to the shipping crane bay was built. This bay crosses the entire discharging end of the galvanizing department and assists greatly in handling large volumes of work directly into railroad cars.

When remodeling the galvanizing department, windows and skylights were installed wherever possible to increase the lighting in the department. Walls and structural steel were cleaned and painted white.

Automatic equipment was installed to control all critical temperatures. New exhaust ventilating fans clear up the atmosphere over pickling tanks and kettles.

Lastly, the sherardizing and small

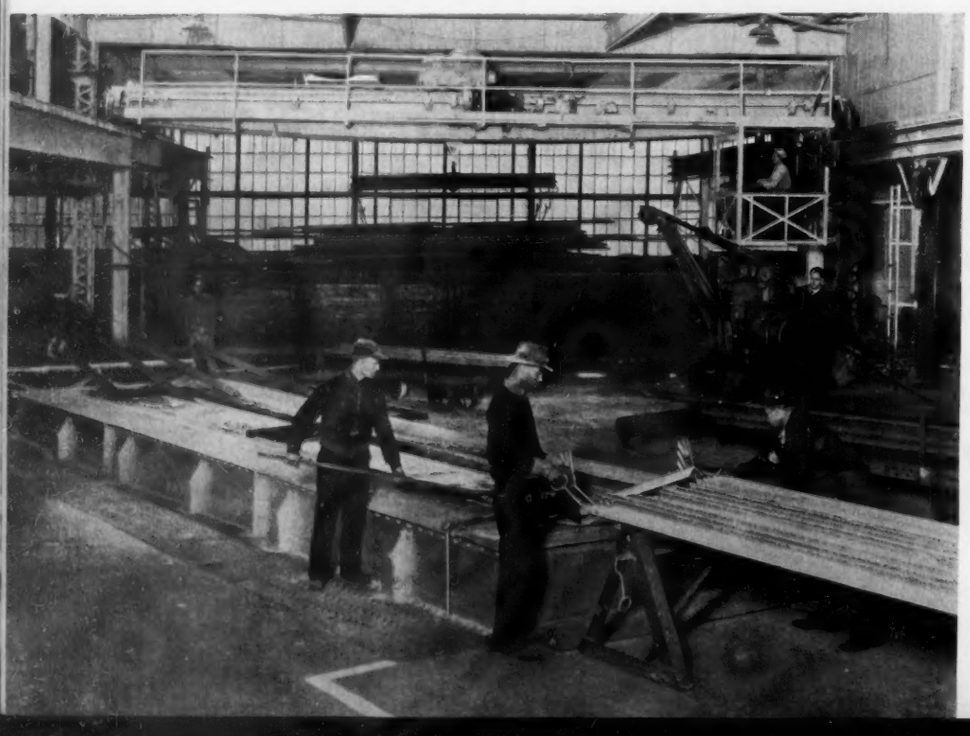
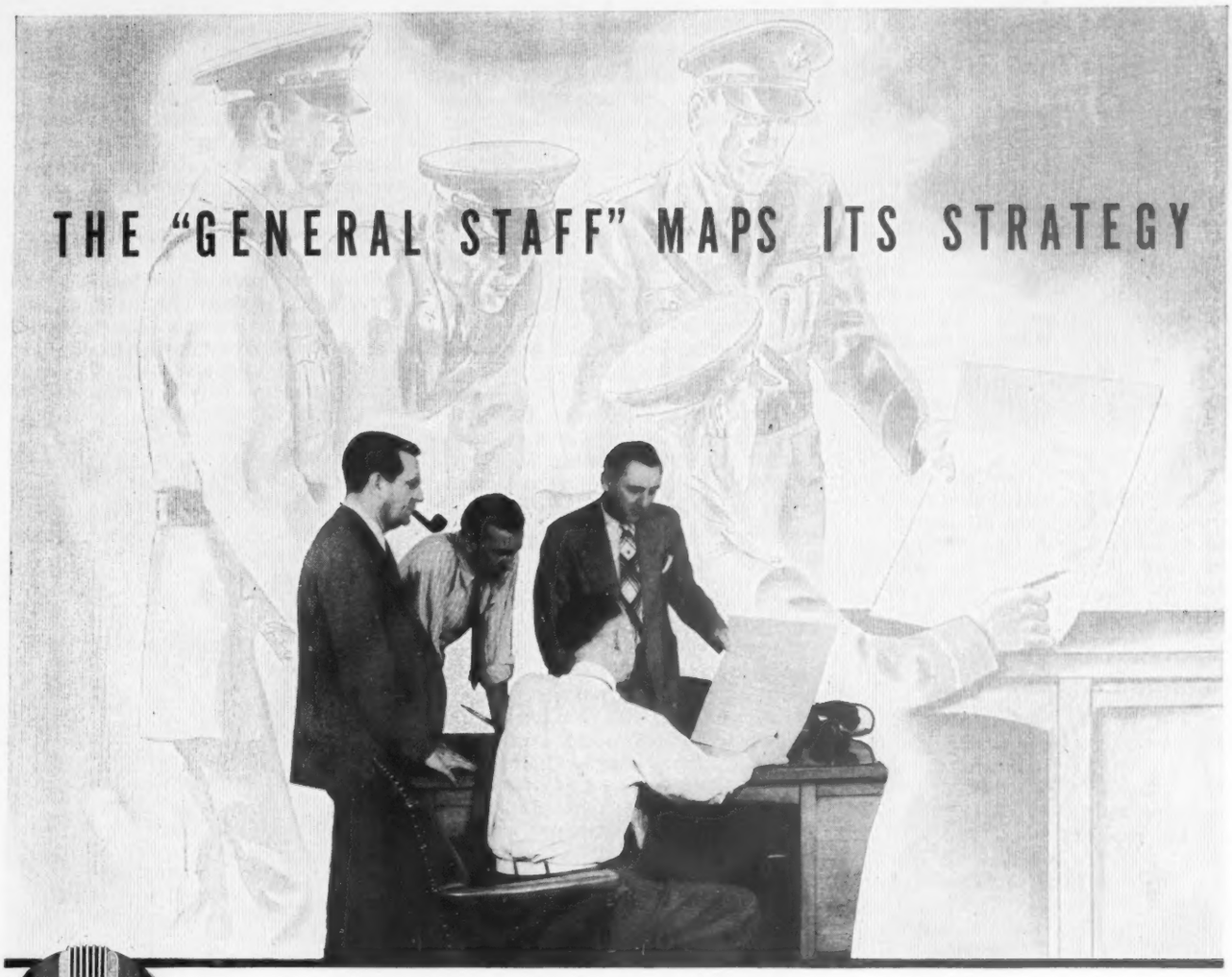


Fig. 1—Large galvanizing room with main galvanizing kettle in foreground, pickling and rinse tanks in rear. Small parts galvanizing department is at left of pickling tanks

THE "GENERAL STAFF" MAPS ITS STRATEGY



GOOD WILL BASED ON GOOD STEEL

The men who control the production of TIMKEN Alloy Steel and TIMKEN Steel Tubing may be likened to the General Staff of a modern army. Each is a specialist in his own particular department. By pooling their individual abilities they are able to solve any problem involving the manufacture and application of alloy steel and alloy steel seamless tubing.

It would be difficult to find a similar group comprising such a wealth of specialized knowledge and experience. The strategy of this "General Staff" spells defeat for the enemies of steel wherever they may be found. It is one of the principal reasons for the outstanding success of TIMKEN Alloy Steel and TIMKEN Alloy Steel Seamless Tubing.

Alloy Blooms, Billets and Bars
Carbon and Alloy Seamless Tubing
Tool and Fine Steels
Stainless Steels

Open Hearth and Electric Furnace Quality

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO
Steel and Tube Division

TIMKEN
ALLOY STEELS

parts galvanizing department was modernized. Sandblast equipment, burnishing barrels and modern handling facilities were installed to round out the department.

The program required five months for its completion. The job was designed, fabricated and installed entirely by plant employes without the loss of a single day's production.

Huge structural members up to 60 feet in length and 6000 pounds or more in weight are handled in the modernized department. Small items from 1 to 30 feet in length are loaded on acid-resisting pickling racks or trays and then carried through the various pickling solutions. Larger work 30 to 60 feet in length is picked up directly by the crane and pickled for galvanizing.

There are four acid tanks, a rinse tank and a flux tank, all of which are 30 feet long, 4 feet wide and 4 feet deep. These tanks are heated with steam, thermostatically controlled. Tanks are parallel with a crane reaching the kettle and all areas in the department. After the work has been pickled, it is placed at the kettle for galvanizing.

A monorail with a system of rope blocks is used in carrying the material through the zinc baths. Of course, the crane is used in case the work is too heavy to be handled by rope blocks.

Work coming into the department arrives by motor trucks and railroad cars and is unloaded by an overhead crane and placed at a point where it can be picked up by another crane located over the galvanizing department. Also, smaller parts and fabricated material to be galvanized flow into the pickling department by industrial trucks. A crane picks the work up from the trucks and loads it on acid-resisting racks or trays, depending upon size and material.

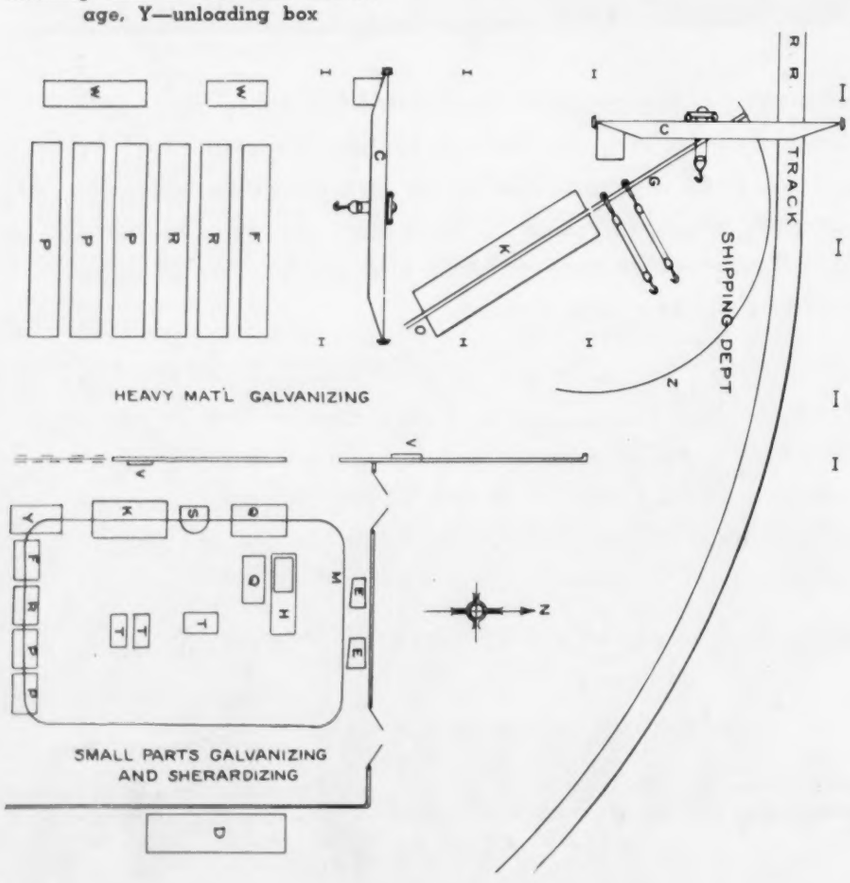
The large galvanizing kettle designed to handle heavy work is fired with gas using high-pressure burners connected to automatic temperature control and a recording pyrometer. This kettle is 30 feet long, 43 inches wide and 48 inches deep. It holds approximately 160,000 pounds of spelter. Maximum production of 8000 pounds per hour can be run through this kettle. In addition to large structural members, much other work such as boilers, steel tanks, large castings, spiral welded pipe, wire fencing, chain and structural steel is galvanized in this department.

A small kettle, 10 feet long, 30 inches wide and 4 feet deep, also is provided in a setting similar design to the larger one. This handles such articles as nuts, bolts, clip angles, small castings, pole line hardware, forgings and threaded steel rods. Small articles are loaded into pickling trays and carried through the acid solutions with an electric hoist. Then they are dumped onto a drying plate prior to loading for galvanizing.

Small parts are either loaded into perforated baskets or strung on wires for galvanizing. The baskets are removed from the zinc bath by a rope block and placed in a centrifugal machine which removes excess spelter. From here the parts are dumped into quench tank. This is followed by inspection and delivery to the shipping department.

The four sherardizing ovens and dust-separating machine are in line under a monorail. The capacity of each oven is 1000 pounds per 8-hour shift. These ovens are fired by low-pressure burners and manually controlled with temperature of each oven recorded by a pyrometer.

Fig. 2—Here C is traveling crane, D—sand blast room, E—burnishing barrel, F—flux tank, G—radial gantry crane with monorail O and track Z, H—inspection table, K—spelter kettle, M—overhead monorail, P—pickle tank, Q—quench tank, R—rinse tank, S—centrifuge, T—sherardizing equipment, V—automatic temperature control, W—cleaning tank, X—rack and tool storage, Y—unloading box



Accommodates Small Shapes

The sherardizing drums are 18 inches in diameter and 60 inches long, and so accommodate a large volume of small shapes. Most of the work handled consists of lag screws, nuts, bolts, washers, small castings, nails, electrical equipment and hinges. A coating of any desired thickness can be given material sherardized.

A chemical laboratory is maintained in the galvanizing department to keep an accurate check on pickling solutions and coatings produced in the galvanizing kettles. Preece tests and thickness-of-coating tests are made from time to time.

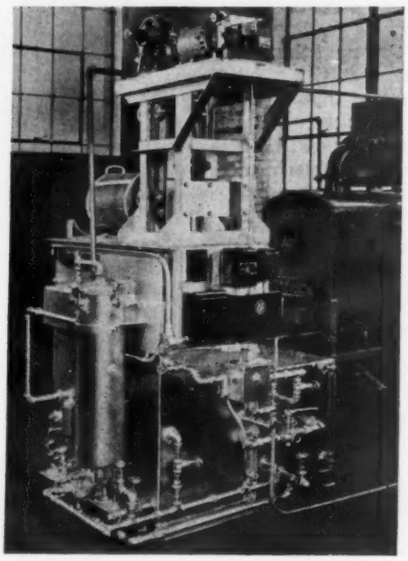
Years of experience with oil field equipment have given much evidence of the value of properly coated galvanized articles. Thus, there is a steady stream of miscellaneous galvanizing jobs such as chain, bolts, nuts, washers, fabricated metal parts, tanks, pipe and the like passing continuously through this galvanizing department, as the plant makes all types of oil field equipment in addition to which a large amount of commercial galvanizing is done.

Low-Baking Enamel

■ Low-Bake "Dulux" enamel manufactured by the E. I. du Pont de Nemours Co., Wilmington, Del., bakes in ¼-hour at 250, ½-hour at 225, 1 hour at 200 and 2 hours at 175 degrees Fahr. It is said to be wrinkle-proof under all normal conditions and to give satisfactory hiding in one coat when applied on solvent-cleaned steel, bonderited steel or primed steel. White and colors are available.

One-Dip Degreaser

■ Detroit Rex Products Co., 13005 Hillview avenue, Detroit, has developed Detrex degreaser with rotating basket design for cup-shaped work which would otherwise tend to trap solvent and cause heavy carryout. Work comes from unit clean, warm and dry-free from solvent vapors, chips and abrasive. Degreaser consists of a storage tank and an automatic elevator mechanism which raises and lowers rotating baskets. A continuous filter is used to keep boiling chamber free of in-



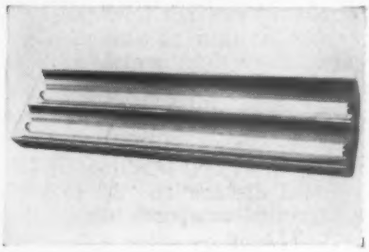
soluble material, and a solvent still removes oil contamination. Degreaser is available in sizes ranging in capacity up to two tons per hour. Operating height to center line of basket spindle is 4 feet 8 inches. Rotating baskets are 12 inches in diameter by 15 inches long. Solvent capacity of boiling chamber and storage tank is 61 gallons.

Fluorescent Luminaires

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has developed fluorescent luminaires for general or supplementary industrial lighting applications requiring low brightness and an extended source. The luminaires are available in both single and two-lamp units, for 110-120 or 220-440 volt supply. It is claimed that because of higher efficiencies heat radiation from these luminaires is lower than for an incandescent source producing equal foot candles.

Steel housing completely encloses reflectors, sockets and controls. Reflectors, finished by Alzak process to easy cleaning, are drawn from No. 18 B&S gage aluminum sheet. Reflecting surface has a specular finish for concentrating type two-lamp unit and a diffuse finish for spread type single-lamp units. All housings are finished outside with silver gray hammerloid surfacing, and inside with baked white synthetic enamel.

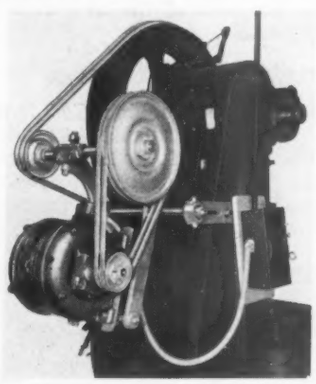
All housings, except on 24-inch



units, are provided with two-point suspension for attaching to ½- or ¾-inch conduit. Hooks for chain suspension, safe-change hangers, or adjustable swivels for ½-inch conduit are available as accessories. Swivels are used where it is necessary to tilt fixtures. Knockouts are provided in both ends of each luminaire for end-to-end connections to form a continuous light strip.

Individual Motor Drive

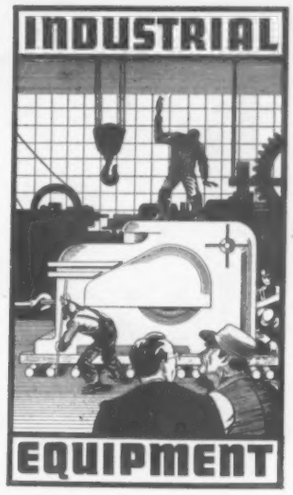
■ Quality Hardware & Machine Corp., 5839 North Ravenswood avenue, Chicago, announces individual punch press drive with ratings 1 to 10 horsepower for converting punch presses and similar types of machine tools to individual motor drives using standard motors. Any operating speed in usual ranges can be obtained by speed reduction through V-belt and sheave drives. Final drive runs directly on fly-wheel of press without alteration or grooving. Proper belt tension is easily maintained by weight of motor. Entire



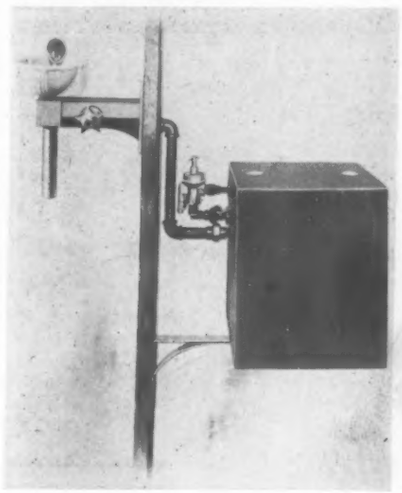
assembly pivots around central shaft, making proper belt tension of final drive automatic.

Water Cooler

■ Water cooling units to provide drinking water electrically-cooled at single or multiple points of use by means of a single refrigerating unit located at any convenient remote point have been developed by Cordley & Hayes, 145 Hudson street, New York. Cooler consists of cool-



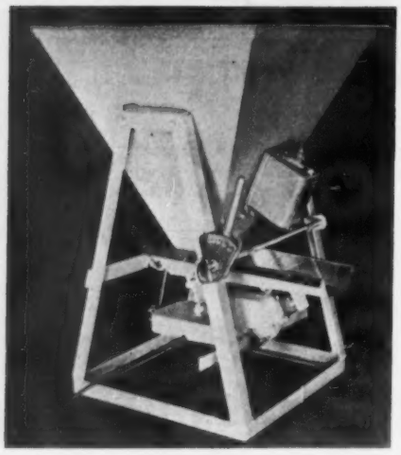
ing unit combined with water tank and coil. Refrigerant runs through copper tubing to each cooler from a condenser installed at any out-of-the-way location. Design safeguards against practically all danger of freeze-ups and water entering the refrigeration system. Coolers eliminate long runs of insulated water pipe, sweating and temperature losses. Desired water temperature



is automatically maintained at every bubbler. Coolers are built in two sizes, wall and floor cabinet types, up to 40 and more gallons per hour, depending upon size of condenser used.

Vibratory Dry Feeder

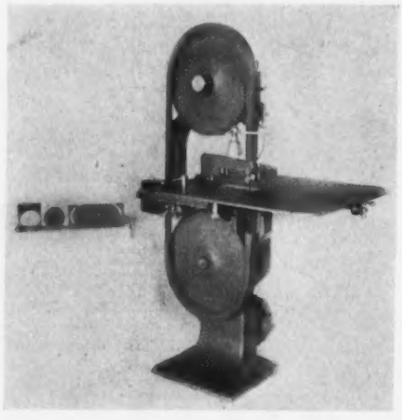
■ Syntron Co., Homer City, Pa., offers a small vibratory dry feeder machine with hopper capacity of 1 cubic foot. Rate of flow of material through feeder trough is regulated by an electro-magnet vibrator controlled by a rheostat mounted in separate wall panel controller supplied with each machine. Small electro-magnet vibrator attached to side of hopper prevents arching over and clogging up of material Feeder is primarily intended for small feeds of material to industrial processing machines such as mixers,



pulverizers, screens, etc., and for handling chemical reagents.

Band Saw

■ Wm. Laidlaw, Inc., Belmont, N. Y., announces JMR-20 band saw capable of cutting accurate radials with diameters ranging from 1½ to 9 inches. Saw offers two speed ranges of 50 to 365 feet per minute or 100 to 725 feet per minute saw travel. Frame, saw wheels, guide arm and table are meehanite metal.



Ball bearing roller saw guides are used with blades ranging from ¼ to ⅝-inch. Clearance of 2½ inches is provided beneath guide arm of radial control screw.

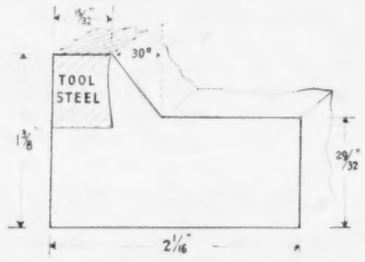
Hard Surfacing Powder

■ Lincoln Electric Co., 12818 Coit road, Cleveland, has developed "Surfaceweld A," a hard surfacing powder for application with the carbon arc. This material when properly applied will give a coating with a hardness of approximately Rockwell 54C. Hardness will vary somewhat depending upon the amount of admixture with the base metal to which it is applied.

This alloy develops its full hardness in the as-deposited condition, maintains its hardness at high temperatures and resists scaling at high temperatures. The deposit cannot be softened by annealing. Its resistance to abrasion is excellent. An advantage is that it can be applied in very thin smooth layers. The limit of the thinness of a layer is governed from a practical standpoint when the deposit becomes so diluted with the base metal that the "Surfaceweld A" will not flow properly. A deposit as thin as 0.025-inch can be applied to light metal, such as 12 to 20 gage.

Die Section

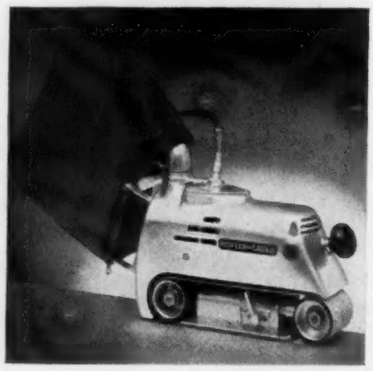
■ Jessop Steel Co., Washington, Pa., has added die section "D" to their line of rolled composite die section shapes. The new section was developed for making the small dies used in manufacture of toys, refrigerators, containers, etc., and consists of a tool steel cutting edge backed by nonhardenable soft steel. Composite



sections may be hardened to a slightly higher degree than solid tool steel because the tough soft steel backing "cushions" the shock in cutting. Since composite die sections are rolled rather than forged they are available in longer lengths. Being rolled to shape, they save from 28 to 47 per cent, in machining and original purchase weight, as compared to rectangular sections. Rolled composite die sections may be formed either hot or cold to special shapes without harm to the weld. Weight per foot of the new section is 7.25 pounds.

Electric Hand Sander

■ Porter-Cable Machine Co., Syracuse, N. Y., offers Take-About sander-grinder BB-10 with double-fan dust collecting system claimed to render unit cool and practically dustless. Balanced 4 ways, sander is easy to



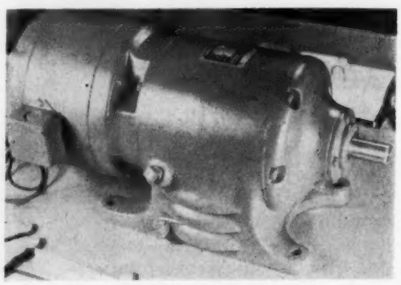
handle and obtains a true finished surface. Belt is 3 x 27 inches and travels at 1475 feet per minute. Pulley is 3 inches wide by 2½ inches in diameter. Correct tension on belt at high speed is maintained automatically. Sander 17 inches long, 5 inches wide and 9¼ inches high, and weighs 23 pounds (36 pounds when shipped). It may be used on wood, metal, stone, glass, plastic materials, etc. Universal 115-volt motor operates on direct or on 25 to 60-cycle alternating current.

Resists Welding Heat

■ Miller Mfg. Co., Camden, N. J., offers Wonder-Weld heat-resisting compound to be used when welding near rubber, glass, wood, paints, upholstery, brass, bronze, nickel and various other metallic platings, to protect them from heat of welding. Mixed to a stiff paste with water, the compound sticks to any surface. To be removed, it need only be washed off with clean water compound then may be stored away till needed again. Two-pound can costs $5.

Motorized Reducer

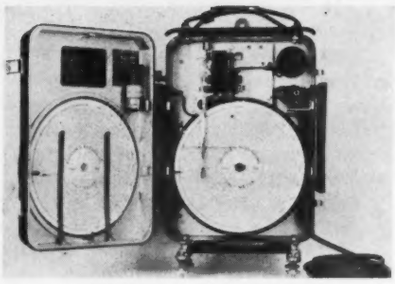
■ Boston Gear Works, Inc., North Quincy, Mass., has recently developed straight-in-line SME Ratiomotor with double reduction drive. The first reduction is the motor pinion driving a helical internal, but in second, a spur pinion drives a



spur internal on output shaft. This double reduction permits gear ratios of 6.25, 7.5, 10, 12 and 16 to 1. Unit has output speeds of 108, 144, 172, 230 and 276 revolutions per minute for either ½ or ¾-horsepower motors.

Recording Voltmeter

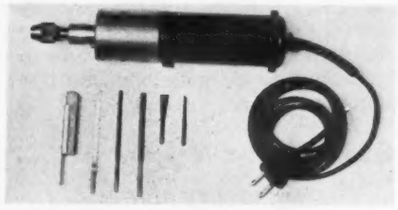
■ The Bristol Co., Waterbury, Conn., offers its 522MS round-chart portable recording voltmeter, a light-weight self-contained instrument built in a weatherproof case for indoor or outdoor service with adjustable mounting legs for pole or wall mounting. Double-range instruments are equipped with snap switch for changing from one range to the other. These instruments when equipped with electric clocks have a reactor installed on inside of case, which makes it possible to use same clock on both voltages. Switching of reactor is accomplished simultaneously with operation of selector switch. Pen-arms are inverted to eliminate possibility of ink running down pen-arm and causing cor-



rosion. They are pivoted at top so pen pressure against chart is delicately controlled by gravity; thus pen pressure is always the same even though pen-arm is bent. Permanently attached 10-foot rubber-insulated connecting cable is supplied with each instrument.

Multi-Purpose Tool

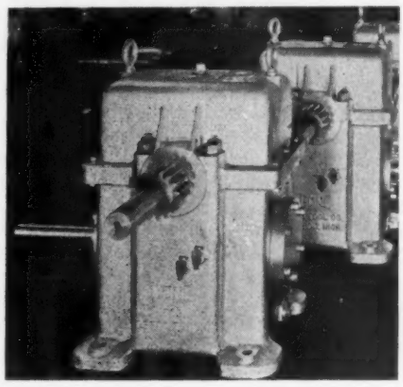
■ H & H Research Co., 1925 West Buena Vista, Detroit, has developed Hoover multi-purpose tools with reciprocating movement to take off last thousandths in special machine production, in die sinking and in pattern, tool and plastic mold making. The tool chips, saws, files, burrs and hones, has maximum diameter



of 1⅝ inches, is 8 inches long, weighs 1 pound and has 6 feet of rubber covered cord. Series A tools have 7/16-inch stroke and develop 6 to 8 pounds push. Series B tools have ⅛-inch stroke and develop 12 to 18 pounds push. Chuck has ⅛-inch capacity, round or square. The tools may be powered with 110-volt (25 to 60 cycle) current.

Heavy-Duty Reducers

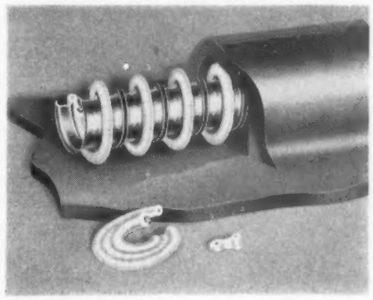
■ Michigan Tool Co., 7171 East McNichols road, Detroit, announces a standard line of heavy-duty speed reducers incorporating Cone-type worm gearing ranging from 3 to 15½-inch center distance, with a



wide selection of standard ratios for each size. These speed reducers are of the vertical worm-on-bottom type with rugged cast housings of high-tensile nickel iron for heavy-duty service. The worms are of chrome-molybdenum-nickel steel with a tensile strength in excess of 150,000 pounds per square inch and worm wheels are nickel bronze with tensile strength of more than 50,000 pounds per square inch. Because of multiple tooth contact between worm and wheels, the new reducers are said to be quiet in operation.

Electric Heating Element

■ Patterson Foundry & Machine Co., East Liverpool, O., announces Flasheat electric heating element claimed to have rapid heat-up, more heat concentration per unit area when desired and rapid water cool-



ing. Pre-forming of unit is not necessary to fit shape of kettle or other body to be heated. Immediate replacement may be made without removal of insulating jacket from kettle or other receptacle on which element is used.

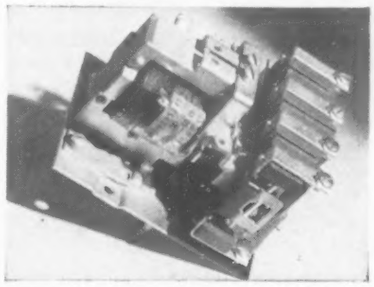
Signal Transformer

■ Acme Electric & Mfg. Co., 1440 Hamilton avenue, Cleveland, has designed heavy duty type signalling

transformers for conversion of 115-volt primary to 4, 8, 12, 16, 20 or 24-volt low voltage supply for operation of bells, gongs, horns, sirens, signalling systems, annunciators, relays, control systems, etc. High silicon, low-loss steel cores assembled with machine wound, vacuum impregnated, hand finished coils are completely sealed in compound that is unaffected by high room temperatures, moisture or cold. Black enameled, rust resisting case includes integral outlet box compartments for primary and secondary connection. Knockouts provide for conduit or armored cable.

Built-In Contactors

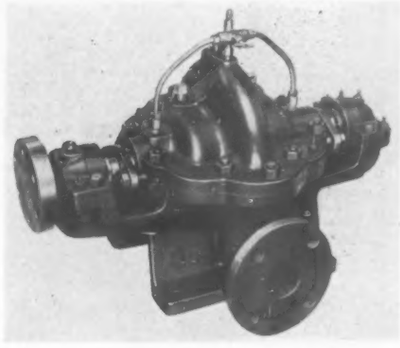
■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., offers contactors for built-in use. Relays are



rated at 10 amperes, 500 volts maximum available in two to eight-pole forms in any combination of normally open or closed contacts. Assemblies of two relays mechanically interlocked and latched-in contactors or relays have also been developed. Identification labels show voltage and frequency rather than usual identifying number. Units are assembled complete on steel bases suitable for mounting on insulating or steel panels as part of controller.

Ball Bearings Included On Single Stage Pumps

■ Allis-Chalmers Mfg. Co., Milwaukee, Wis., announces ball bearings as standard equipment on its line of single stage centrifugal pumps where peripheral speeds are not excessive. Bearing housings are designed so either sleeve or ball bearings may be accommodated. Lock nuts on shaft at both ends hold ball bearings in place without press or shrink fits. Use of an adapter inside main housing provides a double seal which prevents grease from leaking to exterior of pump and at the same time any water which may enter the bearing housing will be thrown off from shaft before it can enter adapter. When pump is dismantled, adapters remain on shaft to keep bearings sealed



Strip Welding

(*Concluded from Page* 44)

the pinch rolls of the uncoiler. Next, end of coil must be centered accurately in shear before it is cut off. As it comes out of the uncoiler it may curve either right or left so it must be centered before shearing. Again at the welder it must be centered accurately to get the same position. The guides are similar at shear and welder. It is evident that guiding is extremely important if good welds that won't break in the mill are to be obtained.

Remove Obstructions

Also, there are obvious things such as having tables, conveyor, shear, welding guides, etc., arranged so end of oncoming strip does not catch on anything. It is easy to lose a minute or two if one little place exists where the strip may catch. In old equipment many operators can remember there were places where one could look at a conveyor and not see how anything could possibly catch on it, and yet every third end would be caught. Practically all such difficulties have been eliminated on the newer equipment.

Even though operation of strip welders has been speeded up considerably, further improvements in speed are believed feasible. Thus it is entirely possible that even though pickle lines and cold mills speed up in the future, the speed of strip welding can be increased so welding will not be the bottleneck in holding up production. It is certainly true that in this work, handling and efficient operation of handling equipment is of utmost importance. The above is a brief discussion of some of these handling problems and how they have been solved.

•

Occupational Disease In Industrial Aspect

■ *Medicolegal Phases of Occupational Diseases,* by C. O. Sappington, M. D., Dr. P.H.; 400 pages, cloth; published by Industrial Health Book Co., Chicago; supplied by STEEL, Cleveland, for $2.75; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W. 1.

The author has considered all aspects of the occupational disease problem as a whole, including measurement and evaluation of industrial exposures, interpretation and application of information relating to physical examinations, diagnosis, clinical laboratory work and X-ray findings; correlation of industrial and medical information in terms of cause and effect relationships; occupational diseases legislation; case decisions of damage suits; commission hearings and review decisions; and insurance coverage. The material is divided into four parts, industrial, insurance, medical and legal.

The author has presented the material in clear and concise language, indicating the co-ordination of the extensive and complicated factors of the field of industrial hygiene and occupational diseases. Each part consists of an introduction and chapter texts, followed by a summary and list of references.

The volume should have a place in the library of all types of industrial plants. The subject of occupational diseases is assuming an important place in the plant program, since the economic cost of occupational diseases has been found to be exceptionally important. A plant need not have an occupational disease exposure to have an occupational diseases claim brought against it. The author is a consultant in occupational diseases and industrial hygiene and has based this book upon his knowledge in the field, and the principles which have been evolved by the United States public health service, United States bureau of mines, Saranac laboratory and other research groups and individual investigators.

Chromates In Brine

■ Chromate treatment of brine is described in "Corrosion in the Refrigeration Industry," a pamphlet issued by Mutual Chemical Co. of America, 270 Madison avenue, New York. Details of preparing, testing and treating brine are given together with a discussion of maintenance of chromate concentration, chrome irritation, clear brine and idle freezing tanks.

Steel Plant Operation

(*Concluded from Page* 57)

without an ingot, hoisting light showed 150 horsepower to start and 68 horsepower to run. This heavy loading of an 85-horsepower motor caused excessive heating which was transmitted to the adjacent brake coils which were stationary and fully enclosed, causing them to burn out rapidly.

The question was "why the heavy overload?" Investigations disclosed that the over load was due to faulty alignment of the trolley which had strained and joints loosened. The brake band mechanism, supported by a member independent of the motor support, had sagged, dragging the brake band when it was supposed to be released. This was aggravated by the fact that snug-fitting pins had been replaced by loose-fitting bolts in the brake operating mechanism..

With the trolley overhauled and tightened up and with properly fitting pins placed in the brake mechanism, the joints were introduced in the brake anchorage so as to make it more flexible in alignment with the brake wheel. Fig. 8 shows a chart made after the repair. Now an ingot is lifted with only 55 horsepower, only 25 horsepower being required with the hoist running light, a reduction of 43 horsepower in friction load.

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Furnished in Flattened Strand, Round Strand, Preformed, Steel Clad and Non-Rotating constructions.

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Galvanized Sheet

(*Concluded from Page* 52)

metal is applied to the joint at about a 10-degree angle. The operator keeps feeding the filler metal under the carbon arc as he proceeds along. This filler metal is a copper-manganese-silicon or similar alloy such as Everdur, Herculoy, etc. Usually a 3/32 or 1/16-inch diameter rod is employed.

In starting to weld, the arc is struck with the carbon at any point on the work. It is held in position until it becomes incandescent. The glow of the heated carbon point provides light so the operator may move the carbon along the plate without establishing an arc until end of filler rod is reached. This avoids false starts with resulting damage to filler metal.

A short arc is used as short as possible without "going out." The arc can be held easily and no difficulty will be experienced in advancing it along the seam. The operator must always be careful to play the arc on the filler metal rather than on the galvanized plate to prevent excessive heating of the galvanized surface.

When proper arc length and the correct heat are employed the weld will be extremely smooth and will appear to have been made by the automatic carbon-arc process.

Welds made with proper carbon arc welding procedure in galvanized sheet steel may equal the steel itself in tensile strength and corrosion resistance. The high corrosion resistance results since the galvanizing is disturbed only slightly. Quality of the weld is same on both top and bottom of the seam.

The operator is careful to keep the heat low enough so the galvanizing is not disturbed.

A few examples of carbon arc welding of galvanized steel sheet at this plant are shown in accompanying illustrations. Fig. 6 is a group of miscellaneous galvanized sheet fittings. Fig. 7 shows a skylight welded of galvanized metal by the carbon arc method.

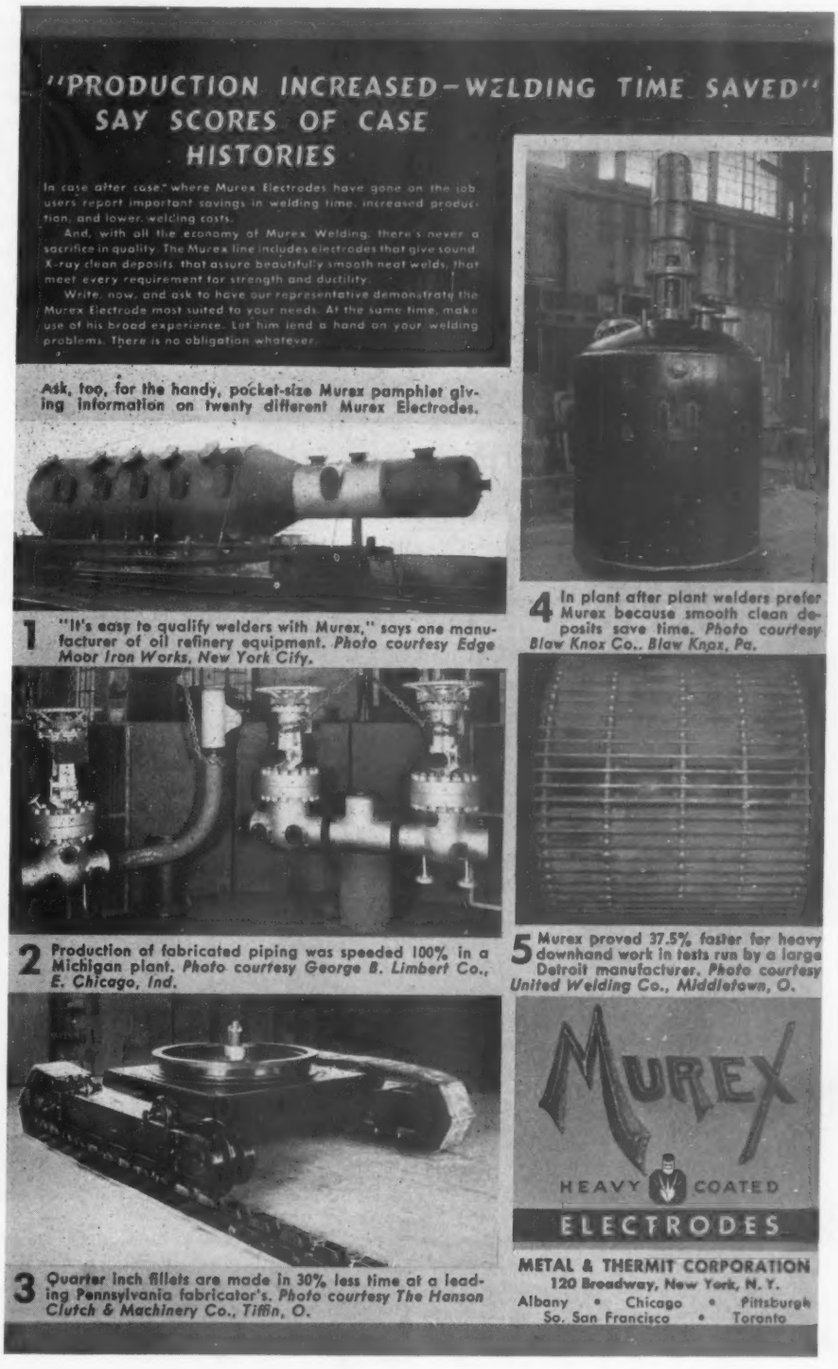
Mr. Schmitt, of Flesch & Schmitt Inc., reports that carbon arc welding may be applied easily by sheet metal men who are accustomed to soldering. He says the process gives good results even in sheet as light as 24-gage. His customers report that the welds are just as corrosion resisting as the galvanized metal. Welded joints, according to Mr. Schmitt, are superior in strength, rigidity and permanent tightness.

Measuring Surface Wear

■ A new method for measuring accurately the wear on bearing surfaces of machinery has been developed by national bureau of standards, Washington. It consists in making minute indentations in the wearing surface by means of a specially shaped diamond point. As material is worn from the surface, the dimensions of the marks change with the amount of material removed. Measurements of these impressions then indicate quickly and accurately the amount of wear. The method already is being utilized in co-operation with other government agencies and a private company, American Instrument Co., Silver Spring, Md., has been given permission to develop the apparatus for commercial use.

PREPARES STANDARDS FOR PROFESSIONAL ENGINEERS

■ As a contribution toward betterment of the social and economic status of the engineer, American Association of Engineers, 8 South Michigan avenue, Chicago, has formulated "Standards on the Classification and Compensation of Professional Engineering Positions." It is hoped that through general approval and adoption of the standards the profession as a whole may secure adequate benefits. Copies of the booklet may be obtained from association headquarters for 25 cents each.


"PRODUCTION INCREASED—WELDING TIME SAVED"
SAY SCORES OF CASE HISTORIES
In case after case where Murex Electrodes have gone on the job, users report important savings in welding time, increased production, and lower welding costs.
And, with all the economy of Murex Welding, there's never a sacrifice in quality. The Murex line includes electrodes that give sound, X-ray clean deposits that assure beautifully smooth neat welds, that meet every requirement for strength and ductility.
Write, now, and ask to have our representative demonstrate the Murex Electrode most suited to your needs. At the same time, make use of his broad experience. Let him lend a hand on your welding problems. There is no obligation whatever.
Ask, too, for the handy, pocket-size Murex pamphlet giving information on twenty different Murex Electrodes.
1 "It's easy to qualify welders with Murex," says one manufacturer of oil refinery equipment. Photo courtesy Edge Moor Iron Works, New York City.
2 Production of fabricated piping was speeded 100% in a Michigan plant. Photo courtesy George B. Limbert Co., E. Chicago, Ind.
3 Quarter inch fillets are made in 30% less time at a leading Pennsylvania fabricator's. Photo courtesy The Hanson Clutch & Machinery Co., Tiffin, O.
4 In plant after plant welders prefer Murex because smooth clean deposits save time. Photo courtesy Blaw Knox Co., Blaw Knox, Pa.
5 Murex proved 37.5% faster for heavy downhand work in tests run by a large Detroit manufacturer. Photo courtesy United Welding Co., Middletown, O.
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Printed Personnel Policy

(*Concluded from Page 47*)

of the circumstances arising in his particular case. For example if all employes knew how long the company paid full salaries in cases of sickness, it is possible some might take advantage of it. On the other hand if the only reason for withholding a particular line of decisions from the employe is because the management is ashamed of them, that is a sure sign there is something wrong with the decisions.

Distribute Safety Rules

Many controversies have arisen over the desirability of distributing written company rules to employes. There can, however, be little argument against having complete safety rules made available to each worker. It is only good business to instruct employes in safe practices in his industry and to warn him against hazards connected with his work. On the other hand, attempting to set down all rules of general conduct in a plant is a laborous job whose worth may be questionable. Perhaps it is better to have a few general rules than to list many pages of "Don'ts" only to leave out the particular one an employe in question is guilty of breaking.

In conclusion, a personnel policy is formulated and refined over a period of many years. It cannot be reduced to writing in one sitting but only by carefully recording on paper from day to day each decision affecting an employe. Only in this way can there be any consistency in the handling of labor.

♦

Synchronous Condenser Runs At High Speed

■ Built by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., a 25,000 kilovolt-ampere gas-cooled synchronous condenser runs at 3600 revolutions per minute instead of the traditional 720 or 900. It employs the turbo-type construction common to high speed generators. The higher speed makes desirable decreases in rotor weight.

Excitation is supplied by an ignitron rectifier which, being electronically controlled and operated, has but little electrical inertia and makes condenser response virtually instantaneous. Thus it is possible to overexcite condenser to high momentary overloads for stabilizing system disturbances.

New Approach To Oil Well Casing Design

■ A new approach to the problem of setting depths for steel casing in deep oil wells has been established by the A. O. Smith Corp., Milwaukee, as a culmination to several years of intensive research on the subject. This is set forth in great detail in a 55-page book, "Smith Casing," which the company published recently. The book also introduced a new super-yield casing developed through application of principles arrived at in the investigational work.

Based on a consideration of stiffness of casing, compressive yield strength, efficiency of the steel and effectiveness of threading, the studies presented indicate that there is a definite limit to the depth a particular size of casing may be set which cannot be extended by increasing the strength of the material beyond the limiting value. This ultimate limit of collapse resistance is fixed by a ratio of outside diameter to casing wall thickness. Below this limit, it was found that the compressive yield strength of the material determined collapse resistance. For every value of this ratio there is a certain maximum useful value of compressive yield strength beyond which there is no gain in collapse resistance.

Variables Affect Collapse

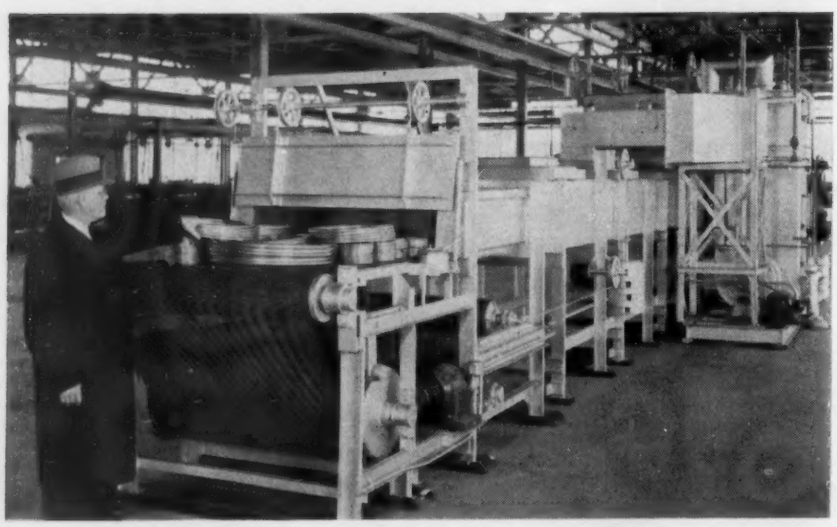
Also affecting collapse resistance is the uniformity of casing dimensions and homogeneity of casing material. In actual testing it was noted that casing always collapsed at values below the compressive yield strength of the steel used. This can be explained, it is stated, by considering that when casing is under high pressures it becomes unstable in the sense that the slightest flaw in the steel or dimensions may precipitate a collapse.

The ratio of this lower value at which collapse occurs to the compressive yield strength of steel at which collapse might be expected to occur is known as the "efficiency" of the steel in the casing. Extended tests showed that every casing, however made now, can do no better in its performance than reach a certain maximum percentage of the compressive yield strength of the steel used.

Results of studies indicate that greater setting depths may be obtained by decreasing the diameter thickness ratio and increasing the compressive yield strength of the steel. As a contribution in this direction, the company has developed a super yield casing (STEEL, June 5, p. 49) with a compressive yield strength of 105,000 pounds per square inch. This casing is made in the lower range of A.P.I. sizes down to 5½-inch outside diameter, with wall thicknesses to meet practically any service. It is manufactured from rolled steel plates in lengths of about 50 feet.

The 5½-inch outside diameter casing in this class, with a wall thickness of 0.42-inch, has a setting depth of 28,000 feet when assumed to be surrounded by salt water. This depth is for a safety factor of 1.

Artificial Load Stabilizes Furnace Atmosphere



■ In this direct-gas-fired annealing furnace at the Linderme Tube Co., Cleveland, a water-cooled tower is used as an artificial load to stabilize furnace atmosphere during low production schedules. Tower, at right, cools gases to tap water temperature and returns them to furnace. Openings at ends of furnace would allow infiltration of air if burners were throttled. Photo courtesy American Gas association, New York

Steelmaking Pauses In Forward Progress

Rate Holds at Year's High; Most Lines in Steady Demand

MARKET IN TABLOID ★

Demand
Continues good in most lines, especially plates.

Prices
Generally firm; new extras on alloy and reinforcing bars.

Production
Steady at 63½ per cent.

■ FIRST check in the steady rise of steelmaking operations since early July came last week, when the rate held at 63.5 per cent.

Slight changes in various districts approximately balanced. Reports from several points indicate ingots are going at once to finishing mills, without accumulation of raw steel. In some instances bookings are less than production, but backlogs are sufficient to insure a continuation of mill activity at about the present level.

Plates are furnishing considerable tonnage for future rolling, maritime commission ships placed since July 1 accounting for 65,000 tons, with five about to be let requiring 13,250 tons more. Among those already contracted, ships requiring 36,750 tons are to be built in yards having steelmaking affiliates. A pipe line let by a Socony-Vacuum subsidiary for the Texas fields will require about 11,000 tons of plates, divided among four producers. Recent pipe line purchases exceed 75,000 tons.

Structural Needs Bring Out Good Tonnages; Auto Corner Turned

While structural lettings are not high several fairly large projects have come out recently, including 3000 tons for an apartment building in New York, 1700 tons for a shipway extension for the Brooklyn navy yard, 1400 tons for a viaduct at Providence, R. I., 1300 tons for an electric plant extension at Washington, 18,000 tons of steel piling for Gilbertsville, Ky., dam of the TVA and 2000 tons for a manufacturing building at Pasadena, Tex. Recent awards include 2400 tons for a hospital in Jersey City, N. J., 1300 tons for a viaduct at Cincinnati, 1000 tons for a Michigan grade separation, 1200 tons for a Philadelphia housing project and 3500 tons of wide-flange beams for battleship construction.

Farm equipment builders find good demand for tractors but implement buying is slack, partly a reflection of lower farm income, with seasonal factors also present. These interests are taking less steel than the general average of all consumers.

Automobile output has turned the corner. Last week 18,365 units were made, compared with 12,955 the preceding week, and 18,700 in the corresponding week last year. Effects of increasing output are felt in many steel lines and are expected to increase through the fall.

Railroads, in spite of difficulties of financing, are buying some rolling stock to meet urgent traffic needs. Chesapeake & Ohio has issued an inquiry for 2500 cars and New York, New Haven & Hartford for 250. Board of transportation, New York, is considering bids on 150 to 300 subway cars. Baltimore & Ohio will build 180 automobile cars in its own shops.

Revision of differentials on hot-rolled alloy steel products, effective Oct. 1, increases base quantity from 3 to 20 tons. Size extras are changed to the same schedule as recently announced for hot-rolled carbon bars.

Tin plate production has declined another point, as a result of smaller demand for vegetable and fruit canning. Exports are at a normal rate and general line cans are in strong demand.

Scrap Firm on Steady Demand; Exports Cause Eastern Advance

Scrap prices are firm and advances in the East reflect buying for export. The composite for steelmaking grades advanced 8 cents last week, to $15.50, highest since the middle of October, 1937. Japan is said to be seeking to buy as much as 500,000 tons on the Atlantic seaboard.

Steadiness of production is shown by the rate holding unchanged in seven districts, with slight changes in the remaining five. Gains included 2.5 points to 60.5 per cent at Buffalo, 3 points to 63 at Cincinnati and 1 point to 44 per cent in Eastern Pennsylvania. Chicago dropped 2 points to 56 per cent and Cleveland 3.5 points to 80 per cent. No changes were made at Youngstown, 55 per cent, Detroit 82, New England 70, Wheeling 86, Pittsburgh 56, St. Louis 57 and Birmingham 75.

COMPOSITE MARKET AVERAGES

	Aug. 26	Aug. 19	Aug. 12	One Month Ago July, 1939	Three Months Ago May, 1939	One Year Ago Aug., 1938	Five Years Ago Aug., 1934
Iron and Steel	$35.98	$35.97	$35.93	$35.82	$35.80	$36.50	$32.24
Finished Steel	55.60	55.60	55.60	55.62	56.00	57.20	54.00
Steelworks Scrap	15.50	15.42	15.33	14.72	14.05	14.44	9.98

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Aug. 26, 1939	July, 1939	May, 1939	Aug., 1938
Steel bars, Pittsburgh	2.15c	2.15c	2.20c	2.25c
Steel bars, Chicago	2.15	2.15	2.20	2.25
Steel bars, Philadelphia	2.47	2.47	2.52	2.57
Iron bars, Terre Haute, Ind.	2.05	2.05	2.10	2.15
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes Philadelphia	2.215	2.22½	2.21½	2.21½
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.15
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.00	2.00	2.05	2.15
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.10	3.20
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.00	2.00	2.03	2.15
Sheets, cold-rolled, Gary	3.05	3.05	3.08	3.20
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.35
Wire nails, Pittsburgh	2.45	2.40	2.45	2.45

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	43.00

Pig Iron

	Aug. 26, 1939	July, 1939	May, 1939	Aug., 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$21.34
Basic, Valley	20.50	20.50	20.50	19.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	21.34
No. 2 foundry, Pittsburgh	22.21	22.21	22.21	21.21
No. 2, foundry, Chicago	21.00	21.00	21.00	20.00
Southern No. 2, Birmingham	17.38	17.38	17.38	16.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	19.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	22.215
Malleable, Valley	21.00	21.00	21.00	20.00
Malleable, Chicago	21.00	21.00	21.00	20.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	28.34
Gray forge, del. Pittsburgh	21.17	21.17	21.17	20.17
Ferromanganese, del. Pittsburgh	85.33	85.33	85.33	97.77

Scrap

Heavy melting steel, Pittsburgh	$16.25	$15.55	$14.55	$15.20
Heavy melt. steel, No. 2, E. Pa.	14.75	13.55	13.15	13.00
Heavy melting steel, Chicago	13.75	13.55	12.75	14.00
Rails for rolling, Chicago	17.75	17.75	17.25	18.25
Railroad steel specialties, Chicago	15.50	15.50	14.75	16.75

Coke

Connellsville, furnace, ovens	$3.75	$3.75	$3.75	$3.75
Connellsville, foundry, ovens	5.00	5.00	5.00	5.00
Chicago, by-product fdry., del.	10.50	10.50	10.50	10.50

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.00c
Chicago, Gary	2.00c
Cleveland	2.00c
Detroit, del.	2.10c
Buffalo	2.00c
Sparrows Point, Md.	2.00c
New York, del.	2.24c
Philadelphia, del.	2.17c
Granite City, Ill.	2.10c
Middletown, O.	2.00c
Youngstown, O.	2.00c
Birmingham	2.00c
Pacific Coast points	2.50c

Cold Rolled

Pittsburgh	3.05c
Chicago, Gary	3.05c
Buffalo	3.05c
Cleveland	3.05c
Detroit, delivered	3.15c
Philadelphia, del.	3.37c
New York, del.	3.39c
Granite City, Ill.	3.15c
Middletown, O.	3.05c
Youngstown, O.	3.05c
Pacific Coast points	3.65c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.80c
Pacific Coast	4.50c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	24.00	35.00
Cold stp.	22.00	22.50	32.00	52.00

Steel Plate

Pittsburgh	2.10c
New York, del.	2.19-2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, Pa.	2.10c
Sparrows Point, Md.	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Pittsburgh	3.35c
Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(*Base, 20 tons or over*)

Pittsburgh	2.15c
Chicago or Gary	2.15c
Duluth	2.25c
Birmingham	2.15c
Cleveland	2.15c
Buffalo	2.15c
Detroit, delivered	2.25c
Philadelphia, del.	2.47c
Boston, delivered	2.52c
New York, del.	2.49c
Gulf ports	2.50c
Pacific Coast points	2.75c

Rail Steel

(*Base, 15 tons or over*)

Pittsburgh	2.00c
Chicago or Gary	2.00c
Detroit, delivered	2.10c
Cleveland	2.00c

Buffalo	2.00c
Birmingham	2.00c
Gulf ports	2.35c
Pacific Coast points	2.60c

Iron

Chicago, Terre Haute	2.05c
Philadelphia	2.37c
Pittsburgh, refined	3.50-8.00c

Reinforcing

*New Billet Bars, Base**

Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt., Pitts.	1.90c
Gulf ports	2.25c
Pacific Coast ports	2.35c

*Rail Steel Bars, Base**

Pittsburgh, Gary Chicago, Buffalo, Cleveland, Birm.	1.80c
Gulf ports	2.15c
Pacific Coast ports	2.25c

**Base prices 20 cents less per 100 lbs. on billet bars, 15 cents less on rail steel, in lots of 20 tons or over of one size, in lengths of 30 feet or over, for shipment at one time to one destination.*

Wire Products

Pitts-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.40
Cement coated nails	$2.40
(Per pound)	
Polished fence staples	2.40c
Galv. barbed wire, standard 12½ gage two-point hog, 80-rod spool $2.74; two-point cattle, 80-rod spool	2.58
Annealed fence wire	2.90c
Galv. fence wire	3.30c
Woven wire fencing (base C. L. column)	67.00
Single loop bale tie, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut Nails

Carloads, Pittsburgh $3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.65c	3.35c
Chicago	2.65c	3.35c
Gary, Ind.	2.65c	3.35c
Detroit	2.70c	*3.45c
Cleveland	2.65c	3.35c
Buffalo	2.65c	3.35c

* Delivered.

Alloy Bars (Hot)

(Base, 3 tons or over)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.70c

Detroit, delivered 2.80c

Alloy S.A.E.	Diff.	Alloy S.A.E.	Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10
5100 0.80-1.10 Cr. 0.45
5100 Cr. spring flats 0.15
6100 bars 1.20
6100 spring flats 0.85
Cr. N., Van. 1.50
Carbon Van. 0.85
9200 spring flats 0.15
9200 spring rounds, squares 0.40
Electric furnace up 50 cents.

Strip and Hoops

(Base, hot strip, 1 ton or over; cold, 3 tons or over)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.00c
Detroit, del.	2.10c
Philadelphia, del.	2.32c
New York, del.	2.36c
Cooperage hoop, Youngs., Pitts.; Chicago, Birm.	2.10c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.80c
Chicago	2.90c
Detroit, del.	2.90c
Worcester, Mass.	3.00c

Carbon	Cleve.,	Pitts.
0.26—0.50	2.80c	
0.51—0.75	4.30c	
0.76—1.00	6.15c	
Over 1.00	8.35c	

Worcester, Mass. $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	2.95c
Detroit, del.	3.05c
Worcester, Mass.	3.95c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00
Cents per pound	
Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	68.5 off
Do. larger, to 1-in.	66 off
Do. 1⅛ and larger	64 off
Tire bolts	52.5 off

Stove Bolts

In packages with nuts attached 72.5 off; in packages with nuts separate 72.5-12½ off; bulk 84 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	60 off
Elevator bolts	60 off
Plow bolts	68.5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	67	70
⅞-1-inch	64	65
1⅛ and larger	62	62

Hexagon Cap Screws

Upset, 1-in., smaller	67.5 off

Square Head Set Screws

Upset, 1-in., smaller	75.0 off
Headless set screws	70.0 off

Piling

Pitts., Chgo., Buffalo	2.40c
Gulf ports	2.75c

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, 11 and 12	63½ 54
Pitts., Chi., Cleve.	65-10 off

Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
⅛	63½	54
¼	66½	58
1—3	68½	60½

Iron

¼	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
⅜ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O.D.	13	$ 9.72	$23.71
1¾" O.D.	13	11.06	22.93
2" O.D.	13	12.38	19.35
2¼" O.D.	13	13.79	21.68
2¼" O.D.	12	15.16	.....
2½" O.D.	12	16.58	26.57
2¾" O.D.	12	17.54	29.00
3" O.D.	12	18.35	31.36
3½" O.D.	11	23.15	39.81
4" O.D.	10	28.66	49.90
5" O.D.	9	44.25	73.93
6" O.D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1 "O.D.	13	$ 7.82	$ 9.01
1¼ "O.D.	13	9.26	10.67
1½ "O.D.	13	10.23	11.79
1¾ "O.D.	13	11.64	13.42
2" O.D.	13	13.04	15.03
2¼ "O.D.	13	14.54	16.76
2½ "O.D.	12	16.01	18.45
2½ "O.D.	12	17.54	20.21
2¾ "O.D.	12	18.59	21.42
3" O.D.	12	19.50	22.48
3½ "O.D.	11	24.62	28.37
4" O.D.	10	30.54	35.20
4½ "O.D.	10	37.35	43.04
5" O.D.	9	46.87	54.01
6" O.D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

Pitts., Chi., Gary, Cleve., Young., Buffalo, Birm.	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅜-inch incl.	43.00
Do., over ⅜ to 41/64-in.incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Youngstown, Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Terre Haute, del.	10.00
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c

Per ton, bulk, f.o.b. port

Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.00	22.50	21.50	23.00
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.12	.....	.....	.....
Boston from Everett, Mass.	22.50	23.00	22.00	23.50
Boston from Buffalo	22.50	23.00	22.00	23.50
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birmingham	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J. from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur	20.50	do., del. Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	55.10
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar

Washed gravel, duty pd., tide, net ton	$21.00-21.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	18.00
Do. barge	19.00
No. 2 lump	18.00-19.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00
Do., del. Pittsburgh 85.33

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon 88.00
2% carbon, 93.00; 1% 103.00
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c
67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do., less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.00
Do, smaller lots 2.10

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c
Do., 2% 12.50c
Spot ¼c higher

Silicon Briquets, contract carloads freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c
Ton lots 5.00c
Less-ton lots 5.25c
Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50
Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

Molybdenum Oxide Briquets, 48-52% molybdenum, per pound contained, f.o.b. producers' plant 80.00c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets: Hot Rolled	Sheets: Cold Rolled	Sheets: Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars: Carbon	Cold Drawn Bars: SAE 2300	Cold Drawn Bars: SAE 3100
Boston	3.88	4.06	5.06	3.85	3.85	5.66	3.71	4.78	4.61	3.46	4.13	8.63	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.40	4.60	4.50	3.51	4.09	8.59	7.19
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	4.55	4.28	3.51	4.06	8.56	7.16
Baltimore	3.70	3.85	3.80	3.55	3.55	5.00	3.55	4.90	5.05	....	4.05	....	....
Norfolk, Va.	3.90	4.00	....	3.75	3.75	5.20	3.75	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.35	4.40	4.40	3.42	3.75	8.15	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.50	3.35	3.65	8.35	6.95
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.55	4.62	3.20	3.75	8.15	6.75
Detroit	3.33	3.43	3.68	3.60	3.65	5.27	3.43	4.50	4.59	3.40	3.80	8.45	7.05
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	....	4.57	3.45	4.00	8.50	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.35	4.30	4.25	3.50	3.75	8.15	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.60	4.95	4.50	3.83	4.34	8.84	7.44
Milwaukee	3.63	3.73	3.73	3.68	3.68	5.28	3.48	4.43	4.38	....	3.88	8.38	6.98
St. Louis	3.62	3.72	3.72	3.47	3.47	5.07	3.38	4.32	4.52	3.61	4.02	8.52	7.12
Kansas City	4.05	4.15	4.15	4.00	4.00	5.60	3.90	....	5.00	....	4.30	....	....
Memphis	3.90	4.00	4.00	3.95	3.95	5.71	3.75	....	5.00	....	4.31	....	....
Chattanooga	3.80	3.90	3.90	3.85	3.85	5.80	3.65	....	4.40	....	4.39	....	....
Tulsa, Okla.	4.54	4.64	4.64	4.41	4.41	6.01	4.32	....	5.39	....	4.79	....	....
Birmingham	3.50	3.60	3.60	3.55	3.55	5.88	3.35	....	4.85	....	4.43	....	....
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60	5.00	5.10	....	....
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25	....	....	....	....
Seattle	3.65	3.85	5.20	3.40	3.50	5.25	3.70	6.50	4.75	....	5.60	....	....
Portland, Oreg.	4.00	4.40	6.10	4.00	4.00	5.50	3.95	6.50	4.75	....	5.85	....	....
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.00	4.45	6.00	10.40	9.55
San Francisco	3.50	3.90	6.00	3.45	3.45	5.05	3.45	6.40	5.15	....	6.55	10.65	9.80

	SAE Hot-rolled Bars (Unannealed): 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.18	7.50	6.05	5.80	7.90
New York (Met.)	4.04	7.35	5.90	5.65	....
Philadelphia	3.85	7.31	5.86	5.61	7.71
Baltimore	3.85	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.10	5.65	5.40	7.50
Pittsburgh	3.40	7.35	5.95	5.50	7.60
Cleveland	3.30	7.30	5.85	5.85	7.70
Detroit	3.38	7.42	5.97	5.72	7.19
Cincinnati	3.65	7.44	5.99	5.74	7.84
Chicago	3.70	7.10	5.65	5.40	7.50
Twin Cities	3.95	7.45	6.00	6.09	8.19
Milwaukee	3.78	7.33	5.88	5.63	7.73
St. Louis	3.82	7.47	6.02	5.77	7.87
Seattle	5.65	....	7.80	7.65	8.45
Portland, Oreg.	5.70	....	7.80	7.65	8.50
Los Angeles	4.65	9.40	8.55	8.40	9.05
San Francisco	4.50	9.65	8.80	8.65	9.30

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds, except 0-1999 pounds (hot rolled sheets only) in New York; 300-1999 pounds in Los Angeles; 0-299 pounds (hoops only) in San Francisco; 300-4999 pounds in Portland, Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York and St. Louis; 450-3749 pounds in Boston; 500-1499 pounds in Buffalo; 1000-1999 pounds in Philadelphia; 300-4999 pounds in San Francisco and Portland; any quantity in Twin Cities.

Galvanized Sheets: Base, 0-1499 pounds in New York, Tulsa; 150-1499 pounds in Cleveland, Pittsburgh; 1-9 bundles in Baltimore, Norfolk; 1-6 bundles in Los Angeles; 300-4999 pounds in Portland, Seattle, San Francisco; 450-3749 pounds in Boston; 500-1499 pounds in Birmingham, Chicago, Cincinnati, Detroit, St. Louis; 1500 pounds and over in Chattanooga, Philadelphia; any quantity in Twin Cities.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1000 pounds and over, except 0-299 pounds in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999 pounds in San Francisco; 0-1999 in Portland.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Aug. 24

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.40 5 0 0	$18 32	2 3 0
Basic bessemer	....	19.59	2 6 0
Hematite, Phos. .03-.05	23.57 5 5 0*	.....	.....
Billets	$34.52 7 7 6	$38.34	4 10 0
Wire rods, No. 5 gage	53.24 11 7 6	43.67	5 2 6
Standard rails	$44.46 9 10 0	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	1.81c to 1.90c	4 15 0 to 5 0 0
Structural shapes	2.09c 10 0 0	1.76c to 1.81c	4 12 6 to 4 15 0
Plates, †¼ in. or 5 mm.	2.29c 10 18 9	2.14c to 2.33c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.72c 13 0 0	2.90c	7 12 6*
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.47c	9 2 6
Bands and strips	2.56c 12 5 0	1.90c to 1.92c	5 0 0 to 5 1 0
Plain wire, base	4.08c 19 10 0	2.33c to 2.66c	6 2 6 to 7 0 0
Galvanized wire, base	4.86c 23 5 0	2.99c	7 17 6
Wire nails, base	....	2.66c to 2.76c	7 0 0 to 7 5 0
Tin plate, box 108 lbs.	$ 4.74 1 0 3	....	.....

British ferromanganese $80.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Rouble Mark
Fdy. pig iron, Si. 2.5	$23.17	4 19 0(a)	$18.00	679.30	$18.65	550	$25.21	63
Basic bess. pig iron	21.65	4 12 6(a)	.....	....	.....	...	27.81 (b)	69.50
Furnace coke	5.38	1 4 2	5.96	225	6.85	202	7.60	19
Billets	34.52	7 7 6	27.27	1,029	29.15	860	38.62	96.50
Standard rails	1.99c	9 10 0	1.69c	1,405	2.06c	1,375	2.38c	132
Merchant bars	2.42c	11 12 0††	1.56c	1,304	1.65c	1,100	1.98c	110
Structural shapes	2.17c	10 8 0††	1.52c	1,268	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm.	2.29c	10 19 3††	1.98c	1,650	2.06c	1,375	2.29c	127
Sheets, black	3.08c	14 15 0§	2.35c	1,958‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.	3.61c	17 5 0	3.42c	2,850	4.05c	2,700	6.66c	370
Plain wire	4.08c	19 10 0	2.40c	2,000	2.48c	1,650	3.11c	173
Bands and strips	2.58c	12 7 0††	1.73c	1,444	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. *Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; †indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	†12.00
Bos. dock No. 1 exp.	14.00
New Eng. del. No. 1	13.50-13.75
Buffalo, No. 1	14.50-15.00
Buffalo, No. 2	12.50-13.00
Chicago, No. 1	13.50-14.00
Chicago, auto, no alloy	12.50-13.00
Chicago, No. 2 auto	10.50-11.00
Cincinnati, dealers	11.50-12.00
Cleveland, No. 1	14.50-15.00
Cleveland, No. 2	13.50-14.00
Detroit, No. 1	11.00-11.50
Detroit, No. 2	10.00-10.50
Eastern Pa., No. 1	16.50-17.00
Eastern Pa., No. 2	14.50-15.00
Federal, Ill.	11.50-12.00
Granite City, R. R.	12.00-12.50
Granite City, No. 2	11.00-11.50
Los Angeles, No. 1	12.50-13.00
Los Angeles, No. 2	11.50-12.00
L. A., No. 1 f.a.s.	15.00-16.00
L. A., No. 2 f.a.s.	14.00-15.00
N. Y. dock No. 1 exp.	12.50
Pitts., No. 1 (R. R.)	17.00-17.50
Pittsburgh, No. 1	16.00-16.50
Pittsburgh, No. 2	14.00-14.50
St. Louis, R. R.	12.00-12.50
St. Louis, No. 2	11.00-11.50
San Francisco, No. 1	12.50-13.00
San Francisco No. 2	11.50-12.00
Seattle, No. 1	11.00-12.00
Toronto, dirs. No. 1.	9.25- 9.75
Valleys, No. 1	15.00-15.50

COMPRESSED SHEETS

Chicago, factory	13.00-13.50
Chicago, dealers	11.50-12.00
Cincinnati, dealers	11.00-12.00
Cleveland	14.00-14.50
Detroit	12.50-13.00
E. Pa., new mat.	16.50-17.00
E. Pa., old mat.	13.50-14.00
Los Angeles	11.00-11.50
Pittsburgh	16.00-16.50
St. Louis	9.25- 9.75
San Francisco	11.00-11.50
Valleys	14.75-15.25

BUNDLED SHEETS

Buffalo, No. 1	12.75-13.25
Buffalo, No. 2	11.25-11.75
Cleveland	10.75-11.25
Los Angeles	14.00
Pittsburgh	14.50-15.00
St. Louis	8.50- 9.00
Toronto, dealers	8.00- 8.50

SHEET CLIPPINGS, LOOSE

Chicago	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Detroit	9.00- 9.50
†Los Angeles	3.75- 4.00
St. Louis	7.50- 8.00
Toronto, dealers	4.25- 4.75

BUSHELING

Buffalo, No. 1	12.50-13.00
Chicago, No. 1	12.50-13.00
Cincin., No. 1, deal.	7.00- 7.50
Cincinnati, No. 2	2.25- 2.75
Cleveland, No. 2	8.25- 8.75
Detroit, No. 1, new	11.25-11.75
Valleys, new, No. 1	14.75-15.25
Toronto, dealers	3.75- 4.25

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	8.50- 9.00
Chicago	7.00- 7.50
Cincinnati, dealers	4.50- 5.00
Cleveland, no alloy	7.50- 8.00
Detroit	6.00- 6.50
Eastern Pa.	10.00
Los Angeles	5.00
New York	†3.50- 4.00
Pittsburgh	10.50-11.00
St. Louis	4.50- 5.00
San Francisco	5.00
Toronto, dealers	4.25- 4.75
Valleys	9.50-10.00

SHOVELING TURNINGS

Buffalo	9.50-10.00
Cleveland	8.75- 9.00
Chicago	7.00- 7.50
Chicago, spcl. anal.	8.00- 8.50
Detroit	7.00- 7.50
Pitts., alloy-free	13.00-13.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	3.75
Buffalo	8.00- 8.50
Cincinnati, dealers	3.25- 3.75
Cleveland	8.50- 9.00
Eastern Pa.	6.50- 7.00
Detroit	6.00- 6.50
New York	†2.50- 3.00
Pittsburgh	9.25- 9.75
Toronto, dealers	3.50- 4.00

AXLE TURNINGS

Boston district	†7.50
Buffalo	11.00-11.50
Chicago, elec. fur.	13.50-14.00
East. Pa., elec. fur.	13.50-14.00
St. Louis	9.00- 9.50
Toronto	4.00- 4.25

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†4.75
Buffalo	7.50- 8.00
Chicago	6.50- 7.00
Cincinnati, dealers	3.25- 3.75
Cleveland	8.50- 9.00
Detroit	6.00- 6.50
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.75- 4.25

RAILROAD SPECIALTIES

Chicago	15.25-15.75

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	13.50-14.00

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	16.00-16.50
Chicago, leaf	15.00-15.50
Eastern Pa.	18.00-18.50
Pittsburgh	19.00-19.50
St. Louis	15.00-15.50

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.50-18.00
Chicago (3 ft.)	16.00-16.50
Chicago (2 ft.)	16.50-17.00
Cincinnati, dealers	17.50-18.00
Detroit	17.50-18.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	19.00-19.50
St. Louis, 2 ft. & less	15.50-16.00

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	13.50-14.00
Cleveland	16.50-17.00
Pittsburgh	18.00-18.50
St. Louis	14.50-15.00
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	14.50-15.00

ARCH BARS, TRANSOMS

St. Louis	13.50-14.00

PIPE AND FLUES

Chicago, net	8.50- 9.00
Cincinnati, dealers	6.50- 7.00

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	7.50- 8.00
Cincinnati, dealers	6.25- 6.75
Eastern Pa.	13.50-14.00
New York	†8.50- 9.00
St. Louis	8.00- 8.50

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	16.50-17.00
St. Louis, No. 1	9.75-10.25
St. Louis, No. 2	12.00-12.50

FORGE FLASHINGS

Boston district	†8.25- 8.50
Buffalo	12.25-12.75
Cleveland	13.50-14.00
Detroit	10.50-11.00
Los Angeles	9.00
Pittsburgh	15.00-15.50

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	15.75-16.25

LOW PHOSPHORUS

Cleveland, crops	17.50-18.00
Eastern Pa., crops	19.50-20.00
Pitts., billet, bloom, slab crops	20.00-20.50

LOW PHOS. PUNCHINGS

Buffalo	16.00-16.50
Chicago	16.00-16.50
Cleveland	15.00-15.50
Eastern Pa., crops	17.50-18.00
Pittsburgh	18.25-18.75
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.50-18.00
New York	†14.00-14.50
Eastern Pa.	17.00-17.50
St. Louis	16.00-16.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Boston district	†14.50
Chicago, net	17.00-17.50
Eastern Pa.	20.50-21.00
St. Louis	17.00-17.50

LOCOMOTIVE TIRES

Chicago (cut)	15.50-16.00
St. Louis, No. 1	12.25-12.75

SHAFTING

Boston district	†15.75-16.00
New York	†16.00-16.50
Eastern Pa.	21.50-22.00
St. Louis, 1¼-3¾".	15.50-16.00

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†10.00
Buffalo, steel	16.00-16.50
Chicago, iron	13.50-14.00
Chicago, rolled steel	15.00-15.50
Cincin., iron, deal.	13.50-14.00
Eastern Pa., iron	17.00-17.50
Eastern Pa., steel	18.00-18.50
Pittsburgh, iron	16.00-16.50
Pittsburgh, steel	19.00-19.50
St. Louis, iron	14.75-15.25
St. Louis, iron	15.00-15.50

NO. 1 CAST SCRAP

Birmingham	†13.00-13.50
Boston, No. 1 mach.	†11.50-11.75
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.00-14.50
Buffalo, mach.	15.50-16.00
Chicago, agri. net	9.50-10.00
Chicago, auto net	12.50-13.00
Chicago, railroad net	11.00-11.50
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	12.75-13.25
Cleveland, mach.	17.50-18.00
Detroit, cupola, net	13.00-13.50
Eastern Pa., cupola	17.00-17.50
E. Pa., mixed yard	14.00-14.50
Los Angeles, net	13.00-13.50
Pittsburgh, cupola	15.50-16.00
San Francisco, del.	12.50-13.00
Seattle	12.50-13.50
St. Louis, cupola	13.00-13.50
St. Louis, agri. mach.	14.00-14.50
St. L., No. 1 mach.	15.00-15.50
San Francisco	12.50-13.00
Toronto, No. 1, mach., net	12.00-12.50

HEAVY CAST

Boston dist. break.	†10.75-11.00
New England, del.	12.50-13.00
Buffalo, break.	11.50-12.00
Cleveland, break, net	13.00-13.50
Detroit, auto net	13.00-13.50
Detroit, break	10.50-11.00
Eastern Pa.	16.50-17.00
Los Ang., auto, net.	13.50
New York, break.	†11.00-11.50
Pittsburgh, break	13.00-13.50

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	11.50-12.00
Chicago, net	7.75-8.25
Cincinnati, dealers	6.25- 6.75
Detroit, net	7.00- 7.50
Eastern Pa.	13.50-14.00
New York, fdy.	†10.00-10.50
St. Louis	7.50- 8.00
Toronto dealers, net	6.50- 7.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	11.50-12.50
Buffalo	14.00-14.50
Chicago, R. R.	15.00-15.50
Cincin., agri., deal.	11.00-11.50
Cleveland, rail	16.50-17.00
Eastern Pa., R. R.	16.50-17.00
Los Angeles	15.00
Pittsburgh, rail	17.00-17.50
St. Louis, R. R.	12.50-13.00

Iron Ore

Lake Superior Ore

Gross ton, 51½ %

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbessemer	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbessemer	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.00
Swedish low phos.	12.00
Spanish No. Africa basic, 50 to 60% nom.	11.00
Tungsten, short ton unit, duty pd. nom.	18.50-19.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	29.00
So. African, 50-52% nom.	29.00
Indian, 49-50%	27.00-28.00

Sheets, Strip

Sheet & Strip Prices, Page 68, 69

Pittsburgh—Sheet operations continue the slight upward trend and for the first time since last year have topped 60 per cent. There has been a slight bulge in bookings, reflecting automobile placements, as well as heavy demand for galvanized sheets. Miscellaneous business continues steady. Galvanized operations last week ran close to 65 per cent and are expected to increase.

Some automotive demand for strip has been seen and bookings reflect heavier tonnages to automobile manufacturers, although most current business is along widely diversified lines. Operations remain around 45 per cent of capacity, with cold mills somewhat more active.

Cleveland — Better releases of sheets and strip are being received by producers, with automotive needs paramount and expected to increase as new models get under heavier production. Other consumers, agricultural, barrel and tube makers are taking substantial tonnages steadily. Low-priced sheets are being shipped and books will be cleared of this material soon.

Chicago—Sheet and strip demand is aided by steady gains in automotive releases. Business elsewhere is rather hesitant, and backlogs are declining. Producers are able to make fairly prompt delivery on heavier gages of sheets, with shipments of lighter gages ranging up to four to five weeks. Cold-rolled material is available in about three weeks.

Boston—Sheet buying is light, but specifications are well maintained. Most of this volume, placed during the price weakness in May, will be released and mostly shipped by the end of the quarter. Small tank fabricators are slightly more active. On the limited amount of new business being placed prices are generally holding.

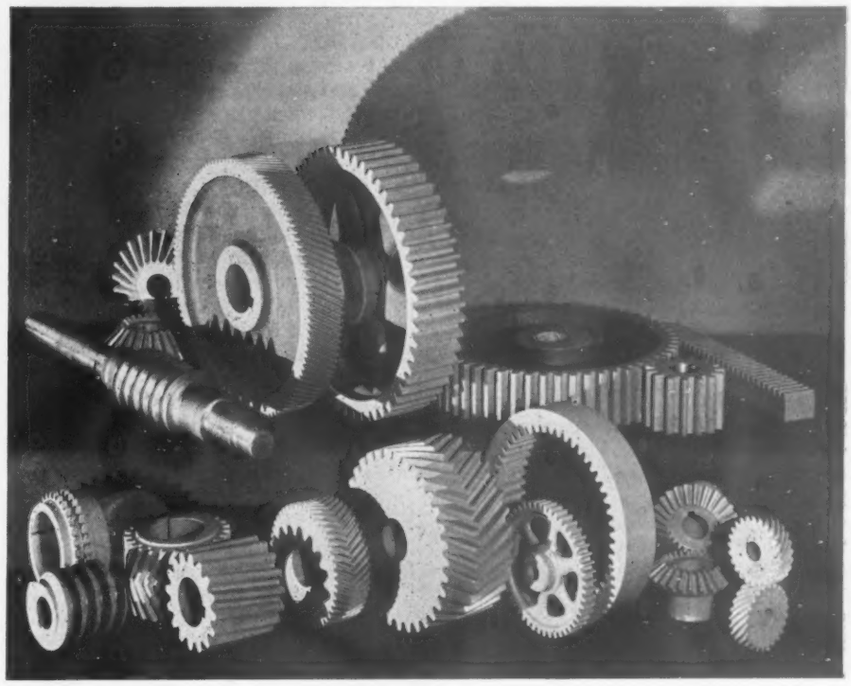
New York—Brisk demand for asphalt containers is bolstering a somewhat sagging market in sheets. Several moderate orders have been placed recently involving black sheets, principally 26 to 28 gage. While showing considerable resistance to seasonal influences, demand from manufacturers of household appliances is becoming less active. Sellers are confident that specifications against low priced contracts made late last spring will be well cleaned up by the end of this quarter.

Philadelphia—E. G. Budd Mfg. Co. is operating above 50 per cent capacity on model work, including Chevrolet frames and body parts for several cars for two or three makers. Miscellaneous stampings are also active. Prices are firm, sales at full prices being made to interests not fully covered at low prices.

Buffalo — Turnover of sheet and strip steel is being helped by fair volume of new small-lot orders. Improvement scored in two previous weeks is sustained, principally on miscellaneous orders. The automotive industry is calling for increased tonnage but not as substantial as is expected in the next few weeks.

Cincinnati—Specifications and orders for sheets are heavier, from miscellaneous users and automotive builders. Demand from the latter is expected to be better as new model season advances. Prices are firm and mills are pressing for specifications against low-priced tonnage.

St. Louis—Specifications are holding well up to the high average earlier in the month. Movement of galvanized roofing to the South has expanded, and demand for lighter gages from the general manufacturing trade is good. Release of strip



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by the automotive industry is somewhat better. Stove manufacturers are specifying heavily on enameling and stovepipe stock.

Birmingham, Ala.—Production of sheets continues at 75 per cent or slightly better. Demand is fairly evenly divided between manufacturers' and roofing sheets. Some gain is noted in output of strip for cotton ties, with advent of a new cotton season.

Plates

Plate Prices, Page 68

New York—Recent award of three ships by Seas Shipping Inc., New York, involving an aggregate of 10,500 tons of steel, brings the total amount of steel required by ships placed since July 1 to approximately 65,000 tons. In addition, another lot of C-1 ships, five in all, is expected to be placed with an eastern yard shortly and will require 13,250 tons. Sun Shipbuilding & Dry Dock Co., Chester, Pa., it is understood, is in line for these ships.

Of this total, 36,750 tons will be required for ships which have been placed with yards having steel producing affiliates. This comprises 13,250 tons for five C-1 ships recently awarded Federal Shipbuilding & Drydock Co., Kearny, N. J., a subsidiary of the United States Steel Corp.; 13,000 tons for two ships for Seatrain Lines Inc., New York, and 10,500 tons for the three Seas Shipping boats to be built by Bethlehem Steel Co.

Pittsburgh—Plate mill operations here are heavy with a fair backlog of orders for a wide variety of uses. Heavy pending tonnage of plates for use in pipe manufacture has added to unfinished orders. Construction work and shipbuilding activities continue to make this division the backbone of current steel production.

Chicago—Miscellaneous demand furnishes a large part of plate orders, total business still being restricted by small requirements of railroads for equipment building and repairs. Tank fabricators are moderately busy, principally on small orders. District fabricators have not shared extensively in recent buying of line pipe.

Boston—Chicago Bridge & Iron Co., Chicago, and Bethlehem Steel Co., Bethlehem, Pa., are low on two sections, filter plant, New Britain, Conn., taking close to 1000 tons of plates, the largest specified work project in the district, contracts expected to be placed this week. A standpipe at Stamford, Conn., 205 tons, has been awarded the former.

Philadelphia—Sun Shipbuilding & Dry Dock Co., Chester, Pa., is believed in line for five C-1 vessels requiring 2650 tons of plates each but the contract is not actually placed. Additional releases are noted from several builders but not well distributed. Virginian railroad repair program is understood to require 2500 tons of plates. Reading Co. is inquiring for 250 to 300 tons for car repairs. Independent plate mills report slackening of miscellaneous demand. Prices are firmer.

Birmingham, Ala.—Plate demand is steady and comparatively active. Shipbuilding, at Pascagoula, Miss., is accounting for considerable tonnage and some is going into specialties and to tank manufacturers in the oil fields.

Seattle—Shops report slow demand for plates. Largest tonnage pending is for the Mud Mountain flood control dam, Washington state, 1400 tons, bids in to U. S. engineer, Seattle. Awards include 125 tons to John W. Beam, Denver, involved in two 96-inch outlet pipes for Wickiup dam, Oregon, 200 tons or more for a 92-foot tug for U. S. engineers, Portland.

San Francisco—The plate market was active and 9925 tons were placed, bringing the aggregate to date to 34,239 tons, compared with 22,355 tons for the same period in 1938. Consolidated Steel Corp., Los Angeles, secured the award for four C-1 type cargo vessels for the maritime commission, involving 9600 tons of plates, 3180 tons of structural shapes, 540 tons of rivets, 108 tons of boiler tubes to be supplied by the manufacturers of the boilers and 660 tons of pipe and tubing.

Plate Contracts Placed

9600 tons, four vessels, C-1 type, maritime commission, Washington, to Consolidated Steel Corp., Los Angeles.

670 tons, two barges, Dunbar & Sullivan Dredging Corp., Chicago, to St. Louis Shipbuilding Co., St. Louis.

205 tons, standpipe, Stamford, Conn., to Chicago Bridge & Iron Co., Chicago.

200 tons, five gas tanks for Southern Counties Gas Co., Santa Monica, Calif., to Lacy Mfg. Co., Los Angeles.

200 tons or more, 92-foot tug and scow for U. S. engineer, Portland, Oreg., to unstated interest.

135 tons, tank for Paterson Oil Terminals Inc., Paulsboro, N. J., to Bethlehem Steel Co., Bethlehem, Pa.

125 tons, two 96-inch outlet pipes, Wickiup dam, Deschutes project, Oregon, to John W. Beam, Denver.

Plate Contracts Pending

3000 tons, 103-inch welded steel pipe, water and power department, Los Angeles; Western Pipe & Steel Co., San Francisco, low on welded steel pipe

Bars

Bar Prices, Page 68

Pittsburgh—Revised differentials on hot-rolled alloy steel products, effective Oct. 1 have been announced. Base is 20 tons; under 20 to 10 tons, 5c per 100 pounds extra; under 10 to 5 tons 10c; under 5 to 3 tons, 15c; under 2 to 1 ton, 35c; under 1 ton, price on application. Size extras have been revised, identical with recent schedule on hot-rolled carbon bars.

On blooms, billets and slabs base will be 7 x 7 inches, up to but not including 10 x 10 inches. On 4 x 4 to 7 x 7 inches $10 per ton extra is charged.

Cleveland—Bar demand continues good, especially in alloy grades, automotive needs entering this field largely. Agricultural implement makers are also taking satisfactory tonnage and other consumers in various lines are also active.

Chicago—Carbon and alloy bar demand from miscellaneous consumers is fairly well maintained, and total business is deriving increasing support from expansion in automotive operations. Alloy bar producers are introducing new quantity extras which establish differentials on lots of one ton and over on the same basis as on hot-rolled carbon bars.

New York—Bar sellers generally report better business this month, specifications from machine tool and automobile builders coming out more freely, with releases from government shops and airplane equipment manufacturers still active. While the real test for new extras on hot carbon bars and hot alloy bars will not come much before the end of this quarter, inasmuch as most consumers are well protected with contracts to Oct. 1, the price structure continues strong, and upward revisions in cold-drawn bar extras, in line with those already announced on plain carbon and hot alloy bars, have been announced.

Philadelphia—Warehouses are strongly opposed to new bar extras but apparently more reconciled to the opinion they are likely to be effected. They are undecided how the extras can be passed on to consumers. Miscellaneous bar demand is well sustained.

Birmingham, Ala.—Bars production is consistently good. Concrete reinforcing continues in major demand, and production approximates 70 per cent.

Buffalo—Mills are awaiting releases on more substantial motor orders. Miscellaneous orders are holding up well. The building industry continues to take heavy tonnage for reinforcing projects.

Pipe

Pipe Prices, Page 69

Pittsburgh—With oil country activity dominating the production field, producers are studying the western market for further possibilities in pipe line tonnage, as well as drill pipe and casing. Standard pipe is moving steadily into consigning stocks and there has been slight improvement in mechanical tubing, resulting from increasing demand for automobile sizes.

Cleveland—Pipe buying is sufficient to keep mills at a high rate of production and backlogs are sufficient for several weeks at the present rate.

New York — Steel pipe business here is more active than in July, with the upward trend likely to continue well into next month or early October, according to leading trade interests. Largest recent award involves 500 tons of 12-inch pipe for piling, let through the Elmhurst Contracting Co., Queens, to Jones & Laughlin Steel Corp.

Close to 13,000 tons of cast iron pipe will be included in a department of purchase inquiry, New York, about Sept. 15. Meanwhile buying is in small lots with utilities doing much better than last year. A substantial inquiry for export also prevails.

Birmingham, Ala. — While there has been some decline in pipe production major plants are operating at four or five days a week. Tonnage is in comparatively small lots, but much of the output is going into utility construction. Inquiries are fairly consistent.

Seattle—Cast iron pipe contracts pending include 550 tons for McChord Field, Fort Lewis, 183 tons at Spokane, Wash., and 145 tons at Columbia City, Oreg.

San Francisco—Few new inquiries for cast iron pipe have appeared and pending business does not exceed 1200 tons. The largest letting went to American Cast Iron Pipe Co., 153 tons of 6-inch for Sacramento, Calif. Carload business, however, is being well maintained and numerous awards have been made lately.

Steel Pipe Placed

11,000 tons, 2 to 8-inch, Magnolia Pipe Line Co., Socony-Vacuum subsidiary, for lines in Texas, to Youngstown Sheet & Tube Co., Youngstown, O., Bethlehem Steel Co., Bethlehem, Pa., Jones & Laughlin Steel Corp., Pittsburgh, and National Tube Co., Pittsburgh.

Cast Pipe Placed

153 tons, 6-inch, Class 150, Sacramento, Calif., to American Cast Iron Pipe Co., Birmingham, Ala.

Cast Pipe Pending

199 tons, 14-inch, Reno, Nev.; alternate bids being taken on cast iron, welded steel or cement asbestos pipe.

174 tons, 6 and 12-inch, Class 150 and 250, San Diego, Calif.; bids opened.

Wire

Wire Prices, Page 69

Pittsburgh — There has been a slight increase in specifications on manufacturers' wire and the month to date is substantially ahead of July. Orders are well diversified, with increase in specifications from automobile manufacturers. Merchant markets are firm, with a slight increase in jobber orders.

Chicago—Sustained demand from miscellaneous consumers and prospects for expanding requirements of the automotive industry give a bright outlook to wire business. Rods are moving better in some directions, and merchant products shipments are fairly heavy for this pe-

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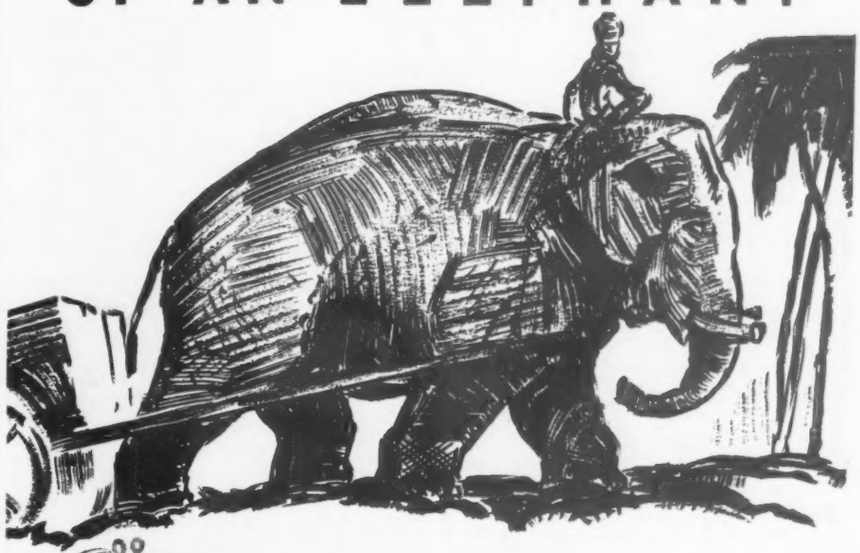

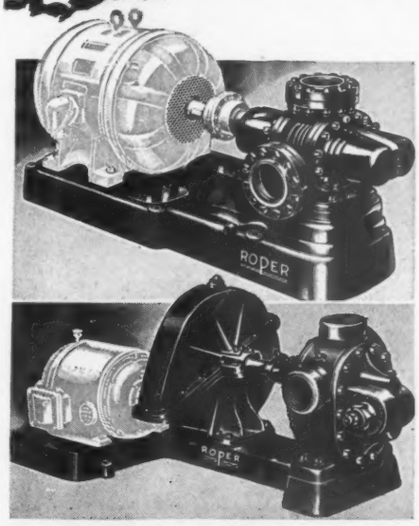

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riod. Lighter orders for merchant goods reflect prior coverage but have not retarded deliveries.

Cleveland—Demand for wire and its products is better from all sources, orders coming in gratifying volume. Prices are steady and not subject to shading. Automobile manufacturers and partsmakers are taking wire in volume as new models get under way, with this outlet expected to expand steadily.

New York—Wire buying and specifications, centered largely on manufacturers' wire products, hold well. Aggregate volume reaching mills thus far this month is substantially above July. Most business is for prompt delivery with little forward buying. Scattered consumers have inquired, however, as to fourth quarter prices which are held in abeyance. Merchant wire volume is off slightly.

Birmingham, Ala.—Wire demand holds close to the better rate evidenced a few weeks ago. A feature is the fact that much of the output is finding a ready market, particularly in farm areas.

Rails, Cars

Track Material Prices, Page 69

Slightly better activity is seen in buying by railroads, but mostly in small lots. Baltimore & Ohio has decided to build 180 automobile cars in its own shops.

American Car & Foundry Co., New York, and Pressed Steel Car Co., Pittsburgh, submitted a joint low bid to New York board of transportation for 150 subway cars at $41,200 each. Pullman-Standard Car Mfg. Co., Chicago, bid $41,450, Bethlehem Steel Co., Bethlehem, Pa., $42,425, Edward G. Budd Mfg. Co., Philadelphia, $48,200. The board may buy 300 cars.

Chesapeake & Ohio has asked bids on 2500 hopper and low side gondolas and New York, New Haven & Hartford on 250 coal cars, bids Sept. 25. Federal court has authorized Missouri Pacific to modernize 200 automobile box cars in addition to 500 previously permitted.

Eastern Massachusetts Street Railway Co., Boston, has ordered ten motor coaches from American Car & Foundry Motors Co., New York, making 325 bought from this company by this user.

Car Orders Placed

Baltimore & Ohio, 180 auto cars, to own shops, Cumberland, Md., and Keyser, W. Va.

Tennessee Coal, Iron & Railroad Co., 49 seventy-ton ore cars, to Pullman-Standard Car Mfg. Co., Chicago.

Rail Orders Placed

Great Northern, 5500 tons, to Carnegie-Illinois Steel Corp., Chicago; previously reported as 550 tons.

Locomotives Pending

Chilean State Railways, seven diesel-electric locomotives.

Car Orders Pending

Chesapeake & Ohio, 2500 cars, bids Sept. 11; includes 2000 fifty-ton hoppers, 400 low-side gondolas with drop ends, 100 low-side gondolas, drop ends, wooden floors.

Navy, two flat and two box cars; bids Sept. 8.

Navy, two box cars on which bids opened Aug. 22, Pressed Steel Car Co., Pittsburgh, low.

New York, New Haven & Hartford, 250 coal cars; in addition to 25 cabooses up for bids Aug. 28.

Shapes

Structural Shape Prices, Page 68

Pittsburgh—New jobs are more plentiful in the shape market, pending tonnage being heavily overbalanced by an influx of private jobs. In the list are a number of extensions to plants and new industrial constructions. Awards over the past week have been relatively few and the tonnage is predominately on public works.

Cleveland — While bookings of structural shapes continue to be made at a gratifying rate numerous projects are about to appear which will add considerably to tonnage. Some of this is public work but the proportion of private jobs is increasing considerably.

Chicago—Awards are light, but a fairly large tonnage still is pending. Inquiries were slightly heavier last week although still below the average of previous months. Private building is better represented in recent inquiries, including 2000 tons for an industrial plant. Outstanding in prospective piling business is 18,000 tons for TVA in Kentucky, on which three producers are low.

Boston—Structural steel inquiry is heavier, bridges up for estimates amounting to around 1000 tons, mostly small spans. Contracts are few and fabricators have small backlogs. A housing project, Dorchester district, Boston, takes close to 3000 tons, shapes and bars.

New York — Structural tonnage placed approximates 5000 tons. Inquiry is irregular but slightly heavier. Plain material prices are firm.

Philadelphia—Shape requirements are fairly active, including some industrial as well as public work.

Seattle—Demands of industrial plants are few and involve lots under 100 tons. Federal projects in recent weeks have given fabricating plants fair backlogs but new business of importance is lacking. Two additional contracts for Coulee dam have been placed by reclamation bureau, Whiting Corp., Harvey, Ill., taking two traveling cranes, 350 tons capacity each, at $167,750, and Koppers Corp., Baltimore, 72-inch ring seal gates for penstocks, tonnage unstated.

San Francisco—Awards of structural steel shapes totaled 5522 tons, bringing the year's aggregate to 85,220 tons, compared with 91,373 tons a year ago. Bethlehem Steel Co. took 600 tons for the underground headquarters building for the water and power department, Los Angeles, and 105 tons for a winery and warehouse for Bohemian Distributors, Vernon, Calif.

St. Louis—New lettings continue light, but outlook for fall is decidedly promising. Much highway and bridge work is in the offing, besides other public works.

Shape Awards Compared

	Tons
Week ended Aug. 26	**25,873**
Week ended Aug. 19	**14,241**
Week ended Aug. 12	**17,975**
This week, 1938	**22,378**
Weekly average, year, 1938	**21,568**
Weekly average, 1939	**22,137**
Weekly average, July	**23,778**
Total to date, 1938	**607,487**
Total to date, 1939	**752,648**

Includes awards of 100 tons or more.

Shape Contracts Placed

3500 tons, wide flange beams for two battleships, Philadelphia and Brooklyn navy yards, to Carnegie-Illinois Steel Corp., Pittsburgh.

3180 tons, four C-1 cargo vessels for maritime commission, Washington; to Consolidated Steel Corp., Los Angeles.

2410 tons, hospital building C., Medical Center, Jersey City, N. J., to Bethlehem Steel Co., Bethlehem, Pa.; direct bids Aug. 18.

1500 tons, grade crossing eliminations, Long Island railroad, Aqueduct, N. Y., to Bethlehem Steel Co., Bethlehem, Pa., through Wilson & English Inc., New York.

1300 tons, viaduct, Sixth street, Cincinnati, to Fort Pitt Bridge Works, Pittsburgh.

1200 tons, Tasker housing project, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

1035 tons, bridge 3653 FAGH-216-D, Avondale, La., to Jones & Laughlin Steel Corp., Pittsburgh.

1000 tons, grade separation bridge, Grand Blanc, Mich., for state, to American

Bridge Co., Pittsburgh

840 tons, bridge, Jefferson county, Kentucky, to American Bridge Co., Pittsburgh.

800 tons, rolling and grinding building, for Rustless Iron & Steel Co., Baltimore, to Bethlehem Steel Co., Bethlehem, Pa.

700 tons, two 350-ton traveling cranes for Coulee dam, to Whiting Corp., Harvey, Ill.

625 tons, Hudson-Belk store, Raleigh, N. C., to Dietrich Bros., Baltimore.

600 tons, garage, warehouse and office building, truck shed and cable warehouse, underground headquarters building, water and power department, Los Angeles, to Bethlehem Steel Co., Los Angeles.

580 tons, apartment 354th street and Riverdale avenue, New York, to Wyatt Iron Works, New York, through A. L. Hartridge Co., New York.

550 tons, dynamometer building, Dayton, O., for United States government, to Bethlehem Steel Co., Bethlehem, Pa.

500 tons, Terrace Village housing project, Pittsburgh, for Pittsburgh housing authority, to Guibert Steel Co., Pittsburgh.

485 tons, additional tonnage, contract 5, Water street improvement, Pittsburgh, to American Bridge Co., Pittsburgh.

450 tons, South Damen avenue bridge, Chicago, to American Bridge Co., Pittsburgh.

375 tons, Theater and housing project, Metropolitan Life Insurance Co., Bronx, N. Y.; to Ingalls Iron Works Co., Birmingham, Ala., through Starrett Bros. & Eken, New York.

370 tons, state highway bridge, project RC-4045, Erie-Niagara counties, New York, to Lackawanna Steel Construction Co., Buffalo; William J. Gallagher, Medina, N. Y., general contractor, $171,467.05; bids July 19, Albany.

300 tons, state bridge 276-B, Ravenna, Nebr., to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, state bridge, Columbia county, New York, to American Bridge Co., Pittsburgh, through A. S. Wikstrom.

283 tons, auditorium, George Washington high school, San Francisco, to Judson-Pacific Co., San Francisco.

250 tons, radial gates, Hiwassee dam, North Carolina, Tennessee valley authority spec 197025, to Treadwell Construction Co., Midland, Pa.

250 tons, warehouse, Bond Mfg. Co., Wilmington, Del., to Belmont Iron Works, Eddystone, Pa.

250 tons, warehouse, Martins Ferry, O., for Wheeling Steel Corp., to Bethlehem Steel Co., Bethlehem, Pa.

210 tons, bridge No. 1260, Mineral county, West Virginia, to Fort Pitt Bridge Works, Pittsburgh.

200 tons, buildings for Permante Cement Co., Los Altos, Calif., to Judson-Pacific Co., San Francisco.

200 tons, factory addition, Firestone Steel Products Co., Riverview, Mich., to Whitehead & Kales Co., Detroit.

200 tons, Pearl River county, Mississippi, to Nashville Bridge Co., Nashville, Tenn.

175 tons, housing project, Chattanooga, Tenn., to Decatur Iron & Steel Co., Decatur, Ala.

160 tons, store for H. L. Green Co., Harrisburg, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, Commerce Bank building, Nashville, Tenn., to Nashville Bridge Co., Nashville, Tenn.

150 tons, freight elevators, Mare Island, Calif., navy yard, to unnamed interest.

135 tons, bridge, Enfield, N. H., to American Bridge Co., Pittsburgh.

125 tons, state highway bridge, project RC-4019, Madison-Onondaga counties, New York, to American Bridge Co., Pittsburgh; Provo Bros. Inc., Syracuse, N. Y., contractor, $282,638.35; bids July 26, Albany.

120 tons, state highway bridge, project FAS-RC-4055, Allegany county New York, to Genesee Bridge Co., Rochester, N. Y.

105 tons, winery and warehouse, Bohemian Distributors, Vernon, Calif., to Bethlehem Steel Co., Los Angeles.

105 tons, bridge 8252, Cleveland county, North Carolina, to Virginia Bridge Co., Roanoke, Va.

105 tons, highway span, Leadville, Colo., to American Bridge Co., Pittsburgh.

100 tons, I-beam bridge, state project 03054, Armstrong county, Pennsylvania, to Carnegie-Illinois Steel Corp., Pittsburgh.

Unstated, 72-inch ring seal gates, Coulee dam penstocks, to Koppers Corp., Baltimore.

Shape Contracts Pending

18,000 tons, piling, Gilbertsville dam, Kentucky, for TVA; Bethlehem Steel Co., Carnegie-Illinois Steel Corp. and Inland Steel Co. low.

3000 tons, apartment building, for 240

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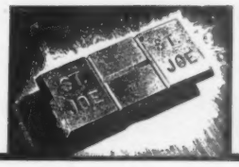

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Central Park South Inc., New York.

2000 tons, plant building, Champion Paper & Fibre Co., Pasadena, Tex.

1700 tons, extension to shipways, navy yard, Brooklyn, N. Y.

1400 tons, viaduct, Providence, R. I.

1349 tons, sheet steel and bearing piles, improvement Los Angeles river channel, Los Angeles; Griffith & Co., Los Angeles Railway building, Los Angeles, low at $633,798.

1300 tons, extension to Buzzard Point plant, Washington, for Potomac Electric Co.

1035 tons, Indiana state bridges; 670 tons at Peru, 250 tons at Oakland City, 115 tons at Valparaiso; bids Aug. 29.

900 tons, building, for United Benefit Life Insurance Co., Omaha, Nebr.

800 tons, factory building, for Anchor Hocking Glass Co., Lancaster, O.

800 tons, 12-story telephone building, Sacramento, Calif., for Pacific Telephone & Telegraph Co.; bids soon.

600 tons, addition to Millers Ford station, for Dayton Power & Light Co., Dayton, O.

600 tons, power plant, for Northern States Power Co., La Crosse, Wis.

500 tons, building for Permante Cement Co., Los Altos, Calif., bids being taken.

450 tons, garage and shop buildings, Ft. Totten, N. Y., for United States war department.

400 tons, shop building, navy yard, Portsmouth, N. H., Turner Construction Co., Boston, low.

397 tons, sheet piling, bureau of reclamation, for delivery at Niland, Calif., invitation 42,293-B; bids opened.

350 tons, state bridge FAP-242-B, Sturgis, S. Dak.

310 tons, shapes and bars, state bridges, Boston-Milton, Haverhill, West Stockbridge and Windsor, Mass.; bids Aug. 29 and Sept. 5; R. W. Coburn, chief engineer, department of public works, Boston.

310 tons, state bridge, Columbia county, New York; A. S. Wikstrom, Bound Brook, N. J., low.

300 tons, state bridge FA-824-A, Linn Grove, Iowa.

275 tons, widening Sixteenth street crossing, Chicago, for Chicago, Rock Island & Pacific railroad.

250 tons, extension to tube mill and warehouse, for Mueller Brass Co., Port Huron, Mich.

225 tons, bridge over Russian river, Mendocino county, California, for state; bids Sept. 6.

225 tons, foundry building, for Bendix Aviation Corp., Bendix, N. J.

215 tons, extension to automatic machine shop, Newport, R. I., for United States naval torpedo station.

200 tons, state bridge FAGM-8533, Washington county, New York.

200 tons, beam spans, Luzena, Ariz.

200 tons, storage plant, Shasta dam, California.

200 tons, steel arch bridge, Woodstock, N. H., bids in.

175 tons, extension to research laboratory, for Aluminum Co. of America, New Kensington, Pa.

175 tons, bus garage, for City Lines Inc., Canton, O.

175 tons, building 101, for Aluminum Co. of America, Cleveland.

160 tons, state bridge Dutchess county, New York; John Arborio Inc., Poughkeepsie, N. Y., low.

160 tons, underpass, Cochise county, Ariz.; bids Sept. 1.

150 tons, state bridge over Merrimac river, Lawrence, Mass., for state of Maine.

140 tons, state bridge over Delaware, Lackawanna, & Western railroad, Tobyhanna, Pa.

140 tons, convent building, for St. Bernard's convent, Fitchburg, Mass.

140 tons, state bridge, Yankton, S. Dak.

130 tons, building, for Phillips Gas & Oil Co., Butler, Pa.

130 tons, municipal hospital, Pittsburgh, Fleisher Engineering & Construction Co., Buffalo, low.

128 tons, state bridge, Dutchess county, New York; Frank T. Westcott, North Attleboro, Mass., low.

125 tons, state bridge FAS-291, Decorah, Iowa.

125 tons, shapes and bars, state bridges, Whitneyville, Somerville and Columbia, Me.; bids Aug. 30, state highway commission, Augusta.

115 tons, power plant addition, Norwich, Conn.

105 tons, state bridge, Haverhill, Mass.; bids Sept. 5.

Unstated, addition to Washington state prison, Walla Walla; bids to Olympia, Sept. 5.

Unstated, traveling cranes, etc., bureau of roads warehouse and shops, Juneau, Alaska; R. J. Sommers, Juneau, low.

Unstated, 85-foot Oregon state span, Washington county; bids to Portland, Aug. 31.

Unstated, garage structure for bureau of reclamation, Leavenworth, Wash.; bids in.

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"We need these gages immediately and "*Greenfield*" is the only company that can deliver a substantial part of the order from stock." (The actual story behind a recent $3,000 gage order taken by a "*Greenfield*" salesman.)

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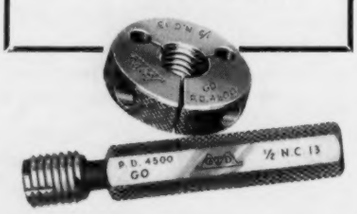

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Tin Plate

Tin Plate Prices, Page 68

Tin plate production continues to decline slowly, being estimated at

64 per cent for last week. Sanitary can orders are hand-to-mouth for fill-in supplies as most buying for packers' needs has been completed. General line business continues strong and miscellaneous business is in good volume. Exports are normal. August shipments are above July.

Reinforcing

Reinforcing Bar Prices, Page 69

Pittsburgh—New projects are few. Many placements have been made over the past week following clarification of price. New extra cards embodying the revamped definition of concrete bars, which eliminates plain bars, have been issued. These cards also eliminate references to jobbers and do away with jobber differentials.

Chicago—Large pending tonnages assure maintenance of concrete bar orders into next quarter. Subway sections on which general contractors' bids have been taken involve 9350 tons. Award of 2900 tons for a local housing project still is awaited.

New York — Prices hold well at recently established levels, though not subject to much test. Buying is mostly small lots.

Philadelphia—Warehouse for Lit Bros. department store will require about 1100 tons of bars and 150 tons of shapes but no date for bids has been set. Several small jobs are in the offing. Prices are firm.

Seattle — Market conditions are firm but new business of importance is light. Mill backlogs are being rapidly reduced and tonnages pending are small. Bids are in for the Mud Mountain dam near Seattle, involving 1400 tons, also for the bureau of roads warehouse at Juneau, Alaska, 108 tons.

San Francisco—A fair tonnage of reinforcing bars were placed during the week, 1871 tons. This brought the total to date to 106,204 tons, compared with 77,739 tons last year.

Concrete Bars Compared

	Tons
Week ended Aug. 26	6,203
Week ended Aug. 19	3,462
Week ended Aug. 12	10,135
This week, 1938	8,331
Weekly average, year, 1938	6,959
Weekly average, 1939	9,687
Weekly average, July	8,076
Total to date, 1938	232,004
Total to date, 1939	329,349

Includes awards of 100 tons or more.

Reinforcing Steel Awards

1250 tons, Terrace village housing, Pittsburgh, to Truscon Steel Co., Youngstown, O.; A. J. Smith, Chicago, contractor.

824 tons, section 12A, Bedford county, Pennsylvania turnpike, to Truscon Steel Co., Youngstown, O.; Holmes Co., Crystal Falls, Mich., contractor.

450 tons, section 9C-2-10-11A, Somerset county, Pennsylvania turnpike, to Bethlehem Steel Co., Bethlehem, Pa.; Central Pennsylvania Quarry, Strip & Contracting Co., contractor.

440 tons, mesh, highway project RC-4052, Warrensburg-Chestertown, N. Y., to American Steel & Wire Co., New York; The Lane Construction Corp., Meriden, Conn., general contractor; bids July 19, Albany.

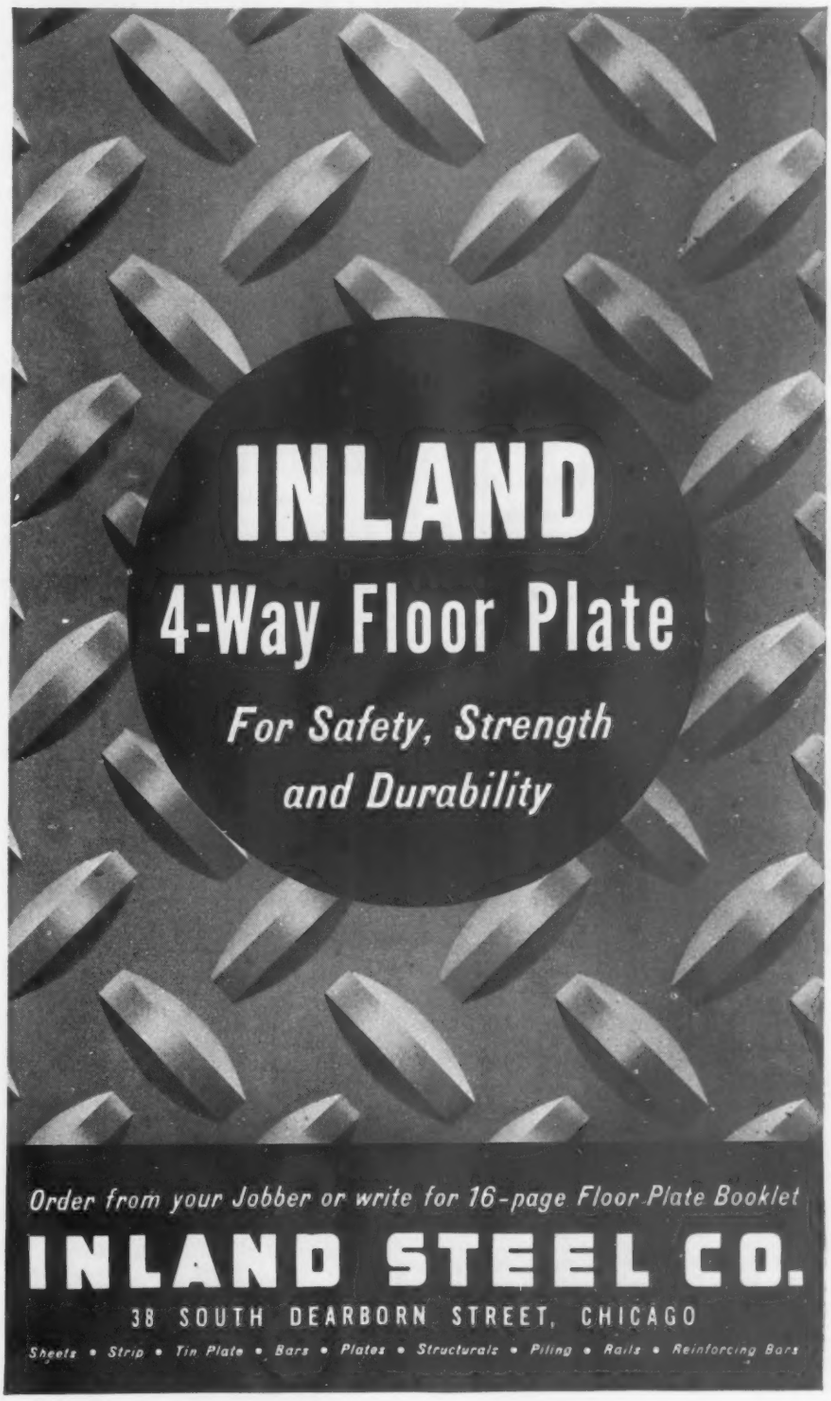
390 tons, section 8B-1, Somerset county, Pennsylvania turnpike, to Truscon Steel Co., Youngstown, O.; Connell & Laub, contractors.

360 tons, mesh, highway project RC-4041, Oneida county, New York, to American Steel & Wire Co., New York; Davis & Stearns Inc., Whitesboro, N. Y., contractor.

345 tons, section 14A, Bedford county, Pennsylvania turnpike, to Bethlehem Steel Co., Bethlehem, Pa.; L. M. Hutchison, Mt. Union, Pa., contractor.

300 tons, plant addition, E. J. Brach & Sons, Chicago, to Ceco Steel Products Corp., Chicago.

300 tons, state hospital, Danville, Ky.,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to Truscon Steel Co., Youngstown, O.; Barnes Construction Co., contractor.

200 tons, mesh, highway project RC-4037, Erie county, New York, to Wickwire-Spencer Steel Co., Buffalo; Depew Paving Co. Inc., DePew, N. Y., general contractor.

200 tons, mesh, highway project RC-4040, Herkimer county, New York, to Wickwire-Spencer Steel Co., Buffalo; Dale Engineering Co., Utica, N. Y., contractor.

172 tons, bureau of reclamation, invitation 21,148-A, Bramwell, Idaho, to Bethlehem Steel Co., San Francisco.

170 tons, power house and office building, Keystone Steel & Wire Co., Peoria, Ill., to Ceco Steel Products Corp., Chicago.

142 tons, highway work, Tehama county, California, for state, to Truscon Steel Co., San Francisco.

130 tons, library building, Normal, Ill., to Missouri Rolling Mill Corp., St. Louis.

120 tons, bridge, Barrington, R. I., to Joseph T. Ryerson & Son, Inc., Cambridge, Mass.; Frank Westcott Co., North Attleboro, Mass., contractor.

110 tons, office building, Keystone Steel & Wire Co., Peoria, Ill., to Inland Steel Co., Chicago.

100 tons, Washburn school, Chicago, to Calumet Steel Co., Chicago.

100 tons, uptown postoffice, Chicago, to Calumet Steel Co., Chicago.

100 tons, sewage plant, New Ulm, Minn., to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O.; R. W. Scott Co., contractor.

Reinforcing Steel Pending

3000 tons, Chicago subway section S-3; Healy Subway Construction Corp. low on general contract.

2500 tons, Jamaica sewage treatment plant, New York; George F. Driscoll Co., New York, low.

2438 tons, including 650 tons of mesh, improvement Los Angeles river channel, Los Angeles; Griffith & Co., Los Angeles Railway building, Los Angeles, low on general contract at $633,798.

2400 tons, housing project Dorchester district, Boston, Rugo Construction Co., Boston, low.

1300 tons, sewage treatment plant, West Warwick, R. I.; James Monroe Co., North Attleboro, Mass., low.

600 tons, municipal center, administration group, Washington, bids in; D. M. W. Contracting Co. Inc., Brooklyn, N. Y., contractor.

450 tons, housing project, Charleston, W. Va.

425 tons, highway projects, Livingston, Dutchess and Rensselaer counties, New York; bids Sept. 6.

300 tons, pumping station, Wilkes-Barre, Pa.; B. C. Coon, Wilkes-Barre, low on general contract.

250 tons, bridge, McHenry county, Illinois.

229 tons, bridge over Santa Paula river, Ventura county, California, for state; bids Sept. 7.

117 tons, warehouse, Antioch, Calif., for Fibreboard Products Co.; general contract to K. E. Parker Co., San Francisco.

108 tons, bureau of roads warehouse and shops at Juneau, Alaska; R. J. Sommers, Juneau, low.

Unstated, four concrete bridges, Idaho state; J. W. Williams, Springville, Utah, low.

Unstated, various road projects Oregon state; bids to Portland, Aug. 31.

Steel in Europe

Foreign Steel Prices, Page 71

London—(*By Radio*)—Following the holiday period practically all iron and steelworks in Great Britain are in full production, reaching almost the limit of further expansion. Heavily filled order books restrict placing of new business. Some delivery delays are occurring, largely owing to the volume of priority government contracts. Sheet mills are exceptionally busy, with structural and shipbuilding departments also well engaged. These conditions are limiting exports and imports are stimulaed by receipts of semi-finished steel from abroad.

Pig Iron

Pig Iron Prices, Page 70

Pittsburgh—Price weakness has appeared in the local pig iron market and some sellers havve offered tonnages below current quotations. Practically no iron is moving at quoted prices, with new business being taken on the contract level or below. The contract level is $1 below quotations, held over from last year's price.

Cleveland—Pig iron producers view the situation with expectation of an upward movement for the remainder of the year. August shipments continue to gain and promise close to 20 per cent over July. Some larger buyers are looking forward and some fairly good tonnages have been booked recently. Fourth quarter price announcement probably will not be made until well into September and some hope is held by producers that better prices may be obtained.

Chicago—Sellers are insisting that contracts priced at less than the current market be closed out by Sept. 30 either by completion of shipment or cancellation. A fairly large tonnage remains on such contracts, now nearly a year old. Little indication is given of a price increase next quarter. Shipments are slightly heavier than a month ago, with foundry coke deliveries sharply ahead of July.

New York—Pig iron business is expanding moderately, with the current month likely to prove better than July, in the opinion of most sellers. Specifications from machine tool builders are improving, but demand from jobbing foundries is just about holding its own, and has shown little variation over the past several weeks.

Philadelphia—Coke shipments indicate August foundry melt will show at least 15 per cent increase. Jobbing foundries share in the betterment, some operating five days a week. Inventories generally are low except at large pipe plants. A Swedish shipyard has placed 5000 tons of high phos iron with a southern furnace.

Buffalo—A gradual upturn continues in pig iron. Volume for the month is almost certain to exceed

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that of a year ago. Sellers report that while buying lacks substantial basis it is encouraging, as more foundries are participating.

Cincinnati — Pig iron is being moved in larger volume, partly to cover remaining tonnage on late 1938 contracts at lower prices. Furnaces will likely oppose rewriting of this tonnage in fourth quarter. The melt also tends upward on demand for automotive castings.

St. Louis—Shipments this month are about even with the same interval in July. The melt has expanded moderately, supported by practically all classes of users. Jobbing foundry operations are at four to five days per week, and these interests report having booked a substantial volume of miscellaneous castings. Prices are firm.

Toronto, Ont.—More interest is developing in pig iron and while buying is for immediate needs only larger contracts for later months are expected as steelmakers add to their backlogs of orders. Current sales are in lots up to 300 tons. Prices are firm.

Scrap

Scrap Prices, Page 72

Pittsburgh — Appearance of new railroad lists, and fairly heavy buying over the first part of this month, have quieted local scrap markets considerably. Considerable tonnage is moving in almost every grade at prices within the quoted range. Railroad offerings this month again are moderate, although it is expected the total will be less than the offerings around Aug. 1. Small railroad offerings closed this week brought prices on the same levels as previous sales.

Chicago — Prices generally are steady, although a slightly easier tone has appeared in the brokers' market for No. 1 steel. Brokers recently paying $14 or more have dropped buying prices to $13.75 and $13.50. Little scrap is available at the latter level. Mill buying is confined largely to one interest, with $14 the top offer, thereby holding the consumer market at $13.50 to $14.

Boston—Scrap prices are mostly unchanged, although heavy breakable and No. 1 machinery cast are up 25 cents and specification pipe is also stronger. Domestic demand is more active, with shipments to Eastern Pennsylvania, notably turnings, heavier. Buying for export is brisk at steady and unchanged prices.

New York — Domestic scrap shipments are slightly heavier with turnings and heavy melting steel moving to Eastern Pennsylvania. Foundry grades are slow. Prices are generally unchanged and firm.

Philadelphia — Scrap is buoyant with prices decidedly on the uptrend and supplies scarcer. Heavy cast and No. 1 heavy melting steel at $17 are well substantiated with sales at that level. Other grades are also higher on new sales. Much of strength is due to export demand which is averaging more than 1000 tons daily from Philadelphia alone.

Buffalo—Underlying strength prevails in scrap although no new business of any consequence has been reported this week.

Detroit—Automobile scrap is increasing, tending to weaken sentiment, but no change has been made in quotations. With high rate of steelmaking locally it is believed large scrap supplies will be absorbed without weakening prices.

Cincinnati—Dealer sentiment in scrap is being weakened by unsettled conditions in Europe, but quotations are unchanged. Mills are resisting price increases, meanwhile accepting shipments steadily.

St. Louis—An important steelmaker has bought 4000 to 6000 tons of No. 1 and No. 2 heavy melting steel at 50 cents higher than the previous purchase about two months ago. Delivery is over the next 60 days. The market is strong, with general scarcity, particularly in cast grades and short rails.

San Francisco — Movement of heavy cast scrap from San Francisco district to the Los Angeles market is a feature Sewer pipe manufacturers in the latter district need this grade, not available at the moment in that territory. During the past two weeks over 1000 tons have been shipped from Stockton, Calif., to Los Angeles.

Toronto, Ont.—Little change is seen in scrap but heavier demand is expected in view of enlarged commitments of steelmakers. Dealer prices are steady. Better demand for cast grades has appeared recently. As a whole the market at the moment is spotty and specialized.

Warehouse

Warehouse Prices, Page 71

Cleveland—Steady demand is holding warehouse sales to a slightly better level than last month, with expectation of an increase in September. Prices show no irregularity.

Chicago — Sales are fairly steady though showing some slackening which is common to this period. Further quiet is indicated during the approaching holiday period but a rising trend is looked for in September and October.

New York—Although most jobbers are experiencing the usual August lull, with volume slightly below that of July, a few note slight improvement. Demand is well diversified, but with few large orders.

Philadelphia—August business is holding even with July volume, which was slightly under June. Demand is well distributed. It is understood no immediate action will be

taken on bar prices in line with higher mill extras.

Cincinnati — Jobbers report a recent upward trend, hoping this presages further expansion in September. Building items are in active demand, with individual sales small. Industrial needs are holding previous volume.

St. Louis — Warehouse business has slightly bettered the July pace during the first three weeks of August. Manufacturing demand has picked up, and railroads are taking more supplies for their shops than heretofore.

Nonferrous Metals

New York — Sudden withdrawal of British support of sterling on Friday unsettled London metal markets and made trading in the domestic tin and export copper markets difficult. With the exception of tin, all domestic primary markets held steady in the face of the grave European crisis.

Copper — Domestic sales were extremely light, averaging less than 500 tons daily, but electrolytic held at 10.50c, Connecticut. Export copper held at around 10.50c, c.i.f. European base ports, early in the week but fluctuated widely on Friday with sales reported from a low of 9.98c to 10.70c, c.i.f. Heavy buying by Germany, Japan and England at the week end swelled the week's turnover

Lead — Prices remained steady at 4.90c, East St. Louis, although foreign prices dropped below the theoretical import level due to the slump in sterling.

Zinc — Demand was negligible but prices held on the basis of 4.75c, East St. Louis, for prime western.

Tin — After advancing steadily to 49.37½c the market broke sharply on Friday following the drop in sterling. Domestic consumers bought heavily at the closing level of 48.87½c on spot.

Equipment

New York — Orders for machine tools continue in good volume, demand for one or two tools at a time coming from a widely diversified group of industries. August totals will match July. Most shops have large backlogs, including substantial foreign orders and production schedules are high. Deliveries on some types of metalworking tools are further extended.

Seattle — The market is in the midst of seasonal lethargy and dealers look for no immediate improvement. There is some demand for road machinery and automotive equipment and electrical items are moving in fair volume. Bonneville authority has placed its larger contracts and has received bids for furnishing pipe fittings, bends, bushings, additional cable, etc. Westinghouse is low at $19,524, to Bonneville for furnishing two oil circuit breakers for the North Bonneville transmission station.

Nonferrous Metal Prices

Aug.	Copper: Electro, del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
19	10.50	10.50	10.12½	48.85	48.50	5.05	4.90	4.75	20.00	12.00	35.00
21	10.50	10.50	10.12½	48.75	48.40	5.05	4.90	4.75	20.00	12.00	35.00
22	10.50	10.50	10.12½	48.70	48.35	5.05	4.90	4.75	20.00	12.00	35.00
23	10.50	10.50	10.12½	49.10	48.80	5.05	4.90	4.75	20.00	12.00	35.00
24	10.50	10.50	10.12½	49.37½	49.00	5.05	4.90	4.75	20.00	12.00	35.00
25	10.50	10.50	10.12½	48.87½	48.25	5.05	4.90	4.75	20.00	12.00	35.00

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Yellow brass (high) 16.85
Copper, hot rolled 18.62
Lead, cut to jobbers 8.30
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 19.60
Seamless copper 19.12

Rods

High yellow brass 12.19
Copper, hot rolled 15.12

Anodes

Copper, untrimmed 15.87

Wire

Yellow brass (high) 17.10

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 6.00-6.25
Cleveland 6.62½-6.87½
Chicago 6.25-6.50
St. Louis 6.37½-6.62½

Heavy Copper and Wire

New York, No. 1 ..... 8.00-8.12½
Cleveland, No. 1 ..... 7.87½-8.12½
Chicago, No. 1 ..... 7.87½-8.12½
St. Louis 7.87½-8.12½

Composition Brass Turnings

New York 5.25-5.50

Light Copper

New York 6.50-6.75
Cleveland 6.12½-6.37½
Chicago 6.25-6.50
St. Louis 6.37½-6.62½

Light Brass

Cleveland 3.62½-3.87½
Chicago 4.00-4.25
St. Louis 3.87½-4.12½

Lead

New York 4.20-4.45
Cleveland 4.00-4.25
Chicago 4.00-4.10
St. Louis 3.85-4.00

Zinc

New York 2.70-2.75
Cleveland 2.25-2.50
St. Louis 2.50-2.75

Aluminum

Mixed, cast, Cleveland 7.75-8.00
Borings, Cleveland 6.25-6.50
Clips, soft, Cleveland 14.75-15.00
Misc. cast, St. Louis 7.00-7.25

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads .. 10.75
Standard No. 12 aluminum 11.75-12.25

Construction and Enterprise

Ohio

CINCINNATI—Burns & McDonnell Engineering Co., 307 East Fourth street, Cincinnati, has been selected by village of Deer Park, Joseph R. Larbes, mayor, to make survey for municipal light plant.

CINCINNATI—City, John E. Root, director of public works; H. F. Wagner, city purchasing agent, will take bids Sept. 5 for furnishing and installing one air compressor, and one double I-beam crane, and will take bids Sept. 6 for one chassis dynamometer.

DAYTON, O.—Lau Blower Co., 954 East Monument avenue, will soon let contract for one-story, 118 x 210-foot steel factory addition.

NEW PHILADELPHIA, O.—City, A. H. Williams, mayor; J. W. Winters, service director, proposes municipal light plant. Council has referred petition to finance committee to raise necessary funds for preliminary survey.

New York

BUFFALO—American Brake Shoe & Foundry Co., Bailey avenue, Buffalo, and 230 Park avenue, New York, proposes addition to its plant here, costing $40,000.

NEW YORK—Consolidated Edison Co., 4 Irving place, plans to make alterations to its electric power plant. Cost $1,000,000. T. R. Galloway, care of owner, is engineer.

New Jersey

ELIZABETH, N. J.—Public Service Electric & Gas Co., Newark, N. J., has approved plans for new two-story operating and service building for electrical distribution department here. Cost over $200,000 with equipment.

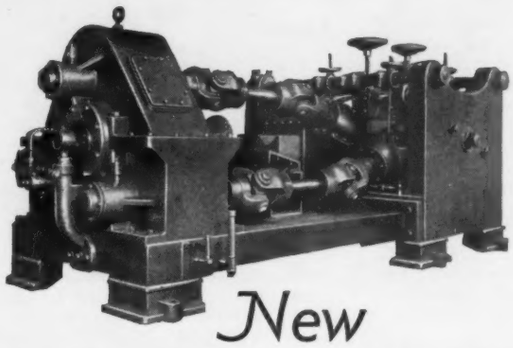
Indiana

HAMMOND, IND.—Local sanitary commission will open bids Aug. 31 for settling tanks, aeration tanks, a power building and equipment for the city sewage disposal plant.

INDIANAPOLIS—Public Service Co. of Indiana will erect a new 50,000-kilowatt electric generating unit at Dresser, Ind., and a 132,000-volt substation at New Castle, Ind.

Louisiana

LAKE CHARLES, LA. — Wackman



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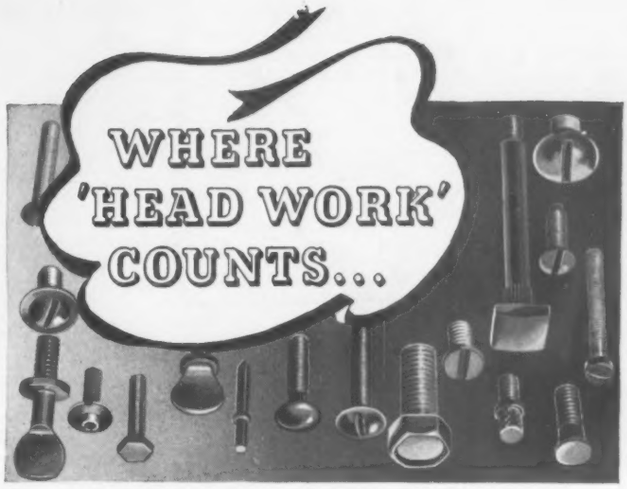

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ADVERTISING PAGES REMOVED

Welded Ware Co., 24128 Seventh street, St. Louis, Mo., has acquired a site here for proposed $150,000 unit for manufacture of steel barrels. Will erect three structures, one for factory, second building for warehouse and third for storage of finished barrels. All three buildings will be connected by overhead conveying system. Work is under supervision of C. F. Wackman.

RUSTON, LA.—City plans erection of building for water and light department. Will install 1000-horsepower engine. Cost $88,500.

SHREVEPORT, LA.—Jesse M. Shelton, architect, Bona Allen building, Atlanta, Ga., will soon call for bids for construction of plant for Coca-Cola Bottling Co. Modern machinery will be installed.

West Virginia

FOLLANSBEE, W. VA.—Follansbee Bros. Co., Third and Liberty streets, Pittsburgh, plans installation of motor-generator equipment, heavy-duty motors and controls, transformers and accessories, and other equipment in connection with expansion and improvements in steel mill here. Cost about $1,250,000.

Virginia

ARLINGTON, VA.—Arlington County votes Nov. 7 on $1,475,000 bonds for electric distribution system.

HARRISONBURG, VA. — Shenandoah Valley Electric Co-operative has voted to double its capitalization to $2,500,000 to provide for expansion in Rockingham, Augusta and Shenandoah counties.

RICHMOND, VA.—Board of supervisors, Henrico county, will take bids Aug. 31 at office of W. F. Day, county engineer, Henrico County Court house, Richmond, for construction of a water distribution system. Estimated cost $150,000.

Missouri

HAMILTON, MO.—Farmers Electrical Co-operative, Ernest Wood, president, has rejected bids and will call for new bids soon on construction of 472 miles of rural transmission lines. Frank Horton, Lamar, Mo., consulting engineer.

NEVADA, MO.—City council is considering report received from William Spann, consulting engineer, Interstate building, Kansas City, Mo., for proposed municipal electric power plant. Project will include distribution system, power substations and other facilities. Estimated cost about $450,000.

Arkansas

OLA, ARK.—United States engineer office, Little Rock, Ark., proposes to start construction early next spring on $3,000,000 Nimrod dam. Provision to be made for future installation of hydroelectric power.

Wisconsin

GENOA, WIS.—Tri-State Power Co-operative Inc., LaCrosse, Wis., has approved plans for about 185 miles of 34,500-volt transmission lines, including erection of two outdoor, step-down power substations. Entire project will cost about $1,500,000. Financing has been arranged through federal aid.

LA CROSSE, WIS.—Northern States Power Co., Eau Claire, Wis., is beginning construction of new steam-electric generating station here. Bids scheduled to be asked soon on main station building and auxiliary structures. Estimated cost $1,500,000. Public Utility Engineering & Service Corp., 231 South LaSalle street, Chicago, is engineer.

MERRILL, WIS.—Merrill Box Co. has been organized by Martin Dietrich and William Piske to manufacture wood boxes. Construction has been started on a box manufacturing plant.

OSHKOSH, WIS.—H. D. Hudson Mfg. Co., maker of precision water well equipment, Chicago, has started an extensive modernization program at its Oshkosh plant, where the machine shop is being expanded, machinery overhauled or replaced and individual electric motors provided for all machines. Capt. H. A. Thorndike is general manager of the Oshkosh unit.

PEMBINE, WIS.—Central Commercial Co., 332 South Michigan avenue, Chicago, plans installation of motors and controls, conveyors, loaders and other equipment in new stone-processing plant here. Cost about $275,000.

Minnesota

AUSTIN, MINN.—Board of water, electric, gas and power commissioners, Jane C. Todd, secretary, has rejected bids and is now taking new bids to Aug. 31, 7:30 p.m., on mechanical equipment for the municipal light plant. Helmick, Edeskuty & Lutz, 412 Essex building, Minneapolis, consulting engineers. Certified check 5 per cent to accompany bid.

CLEMENTS, MINN.—Central Minnesota Power Co-operative, G. E. Luescher, secretary, is taking bids to Sept. 1, 10 a.m., on constructing 154 miles of rural transmission lines. Banister Engineering Co., 1586 University avenue, St. Paul, consulting engineer. Certified check 5 per cent to accompany bid.

COOLEY, MINN.—Butler Bros., iron mining company with headquarters in St. Paul, has announced plans for expanding the roasting and magnetic concentrating pilot plant at Cooley to four units at cost of $200,000. Emmett Butler is president.

MINNEAPOLIS—Purzone Inc., H. A. Ohlgren, president, has started construction of an oil refinery at 85 Thirtieth avenue, North, total cost to be $100,000.

MOORHEAD, MINN. — City council plans to call special election to vote on construction of a 1,000,000-gallon water storage tank. R. G. Price is city clerk.

SPRING PARK, MINN.—L. E. Streater Lumber Co. has started construction of a 1-story millwork plant and will install considerable new woodworking equipment.

STEPHEN, MINN.—Village, J. Forrest Yetter, clerk, is taking bids to Sept. 1, 3 p.m., in triplicate, for a 75,000-gallon elevated steel water tank. P. C. Bettenburg, 1437 Marshall avenue, St. Paul, consulting engineer. Certified check 10 per cent to accompany bid.

ST. LOUIS PARK, MINN.—Village, Joseph Justad, recorder, is taking bids to Sept. 5, 8 p.m. on furnishing all labor and materials in connection with a deep well pump, a booster pump, electrical and piping connections. Rose & Harris, 416 Essex building, Minneapolis, consulting engineers. Certified check 5 per cent to accompany bid.

Texas

AUSTIN, TEX.—REA has allotted $605,000 for constructing 825 miles of lines in Lee, Washington, Williamson and Bastrop counties. William G. Morrison, engineer, 2102 Bryan street, Dallas, Tex.

DENISON, TEX.—City, A. M. Breneke, city engineer, proposes installation of $240,000 waterworks and $75,000 sewer improvements.

HARRISBURG, TEX.—A. S. Bergendahl, engineer, Bankers Mortgage Trust building, Houston, Tex., has plans for iron smelting plant. Cost $500,000.

KARNES CITY, TEX.—Karnes City Electric Co-operative has made application for additional loan of $80,000 to extend 100 miles of rural lines.

TEXAS CITY, TEX.—Union Carbide & Carbon Corp., 30 East Forty-second street, New York, plans installation of motors and controls, transformers and accessories, regulators, conveyors and other equipment in new chemical and plastic products manufacturing plant here. Cost over $1,000,000.

WEATHERFORD, TEX.—City, Conrad F. Russell, mayor, will take bids Sept. 12 for light and power plant. Albert C. Moore & Co., 2404 Smith-Young tower, San Antonio, Tex., consulting engineer.

Kansas

WADSWORTH, KANS.—United States government, veterans administration, L. H. Tripp, director of construction, 764 Arlington building, Washington, is taking bids to Sept. 12, 1:30 p.m. on construction of a complete steel water tank and tower.

Nebraska

LEXINGTON, NEBR.—REA has allotted $69,000 to the Dawson County Public Power district to finance construction of about 100 miles of three-phase rural transmission lines.

Montana

KALISPELL, MONT.—Montana State highway commission, D. A. McKinnon, state highway engineer, will soon take bids for construction of a district shop and maintenance building.

Pacific Coast

LOS ANGELES—Central Mfg. District, a corporation, has awarded contract for construction of a 1-story, 289 x 340-foot warehouse building on District boulevard. Cost $92,000.

LOS ANGELES—United States Rubber Co. is erecting a new warehouse building, 210 x 260 feet at 5675 Anaheim-Telegraph road, Los Angeles, at a cost of $70,000.

Canada

OTTAWA, ONT.—Fiberglas Canada Ltd., care of M. B. Gordon, 140 Wellington street, Ottawa, proposes new glass manufacturing plant here at cost of $50,000.

ST. CATHERINES, ONT.—American Distillery Co. Inc., 405 Lexington avenue, New York, plans erection of distillery plant here. Cost $100,000.

REGINA, SASK.—Consumers Co-operative Refinery, will soon take bids for laboratory, cracking plant, boiler and pump house. Cost $125,000. H. L. Fowler is manager.

READER Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Follow Nature's Laws

To the Editor:

In his recent letter to STEEL Mr. Berry speaks of our government balancing budgets for us by means of government controlled tariffs.

Where have we heard of the beam in the eye of him who proposes to remove the mote from his neighbor's eye?

The government surely is masterly at budget balancing, and what have the forest trees to do with the dust bowl? Were not the bowls the product of the ripping out of the grass growth of the prairies where no trees of any consequence had existed?

Has the industrialist made the slums? The slums preceded the industrial era. There were more slums and more misery in the times of hand labor than exist today. Perhaps because all have not been equally lifted in the scale of living the slums that exist are more apparent.

Higher and higher tariffs and bigger and better bonuses for the farmer are of no help. These are the things which Mr. Berry suggests. They are bootstrap ideas and for every cycle of increased tariffs and bonus-giving a jacking up of wages must follow with an equally bitter disappointment in the end for all of us.

Were we all to have our salaries, wages, incomes doubled tomorrow, we would be a little worse off than today because many of us would let down in our effort to do our share. A dollar received for no effort is worth nothing. Money has purchasing power only as it takes labor to acquire it. This is a broad statement and must be applied to the population as a whole.

The "useless longings" of the proponents of the "good old days" are more than balanced by the "wishful thinking" of the new dealers, with the difference, too, that the former were right at least half the time and the latter have yet to make good in anything they have tried. Truly "the trees said unto the brambles, 'Come rule over us.' "

In our efforts to "direct the government into those more orderly approaches" we must above all be able to persuade the new dealers to forsake their nostrums and their attempts to swim against the stream of the natural sequence of things but to try to accommodate their activities to nature's laws.

It may be too much to ask these brethren to stop and reverse their course at once, but if they continue their present procedure, let them tell us how soon they will do away with the increasing burden of debt, the industrial turmoil, the lack of respect for law, the gloom and uncertainty of business, all of which they have created; and whether after giving us such a prediction they will promise to withdraw definitely, permanently and completely if they fail.

NEMO

Cleveland

Benefit in Long Run

To the Editor:

It is our opinion that the action of congress in refusing to approve the spend-loan plan and their apparent determination to at least make some start in the direction of retrenchment has had a most beneficial effect on business for, while we cannot actually determine the cause, business inquiries and active prospects have increased almost immediately following this congressional action.

It has always been our opinion that while possibly some businesses might suffer slightly through government retrenchment that within a short time private enterprise would be so encouraged that they would begin to go ahead with their future plans and that actual spending from this source would far exceed the loss realized through government retrenchment.

While there may still be some men in political office who preach retrenchment on one hand and solicit federal grants for themselves on the other, it is our opinion that the great majority of industries would prefer economy in federal expenditures and would be perfectly willing to accept a loss for a short time, knowing full well that in the long run they would be greatly benefited.

We feel sure that if congress will continue in this direction, the year 1940 will show a decided improvement over anything we have had since 1933.

A. B. SHUFELDT

Universal Road Machinery Co.,
Kingston, N. Y.

Sees Prosperous Period

To the Editor:

I have a distinct feeling that there is going to be a prosperous period. If the war scare dies down it will be on legitimate work. If the war scare develops into a war it will be on less gratifying but temporarily profitable work.

My own belief is that just as we spoke of peace as being established forever and war being impossible in 1914, after which we got the biggest war in the world, our present talk of war being inevitable is going to result in our having a deadlock without any war.

As president of this company, you can put me down as feeling that the congressional attitude will act as a stimulus to business though I do not regard it as essentially important.

JOSEPH S. THOMPSON

President,
Pacific Electric Mfg. Corp.,
San Francisco

An Outstanding Success . . .

The New

NORTON METAL BONDED DIAMOND WHEEL

INTRODUCED in the early spring after extensive field and laboratory tests, the Norton Metal Bonded Diamond Wheel is making economy records everywhere—is reducing to a new low the cost of reconditioning cemented carbide single-point tools.

For example, on off-hand roughing jobs where considerable stock must be removed, the Norton Metal Bonded Diamond Wheel is averaging an 80% saving in time over silicon carbide wheels and with no damage to the tool from heating.

On off-hand resharpening jobs the Norton Metal Bonded Wheel (120 grit) is showing many times the life of resinoid bonded diamond wheels. It resists grooving and the rounding of corners when grinding chip breakers.

If you are using cemented carbide single-point tools you'll surely want to try the new Norton Metal Bonded Diamond Wheel.

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